

CALIFORNIA ENERGY RESOURCES CONSERVATION

AND DEVELOPMENT COMMISSION

INTEGRATED ENERGY POLICY REPORT

ELECTRICITY ENVIRONMENTAL PERFORMANCE REPORT

WORKSHOP:

ONCE-THROUGH COOLING AND

ASSESSMENT OF AVIAN MORTALITY FROM COLLISIONS AND

ELECTROCUTIONS

CALIFORNIA ENERGY COMMISSION

1516 NINTH STREET

HEARING ROOM A

SACRAMENTO, CALIFORNIA

TUESDAY, JUNE 28, 2005

9:00 a.m.

REPORTED BY:

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CONTRACT NO: 150-04-002

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P R O C E E D I N G S

COMMISSIONER GEESMAN: This is the second day of the workshop held by the Energy Commission's Integrated Energy Policy Report Committee on our Electricity and Environmental Performance Report.

I'm John Geesman, the Committee's Presiding Member. To my left is Commissioner Jim Boyd, the Associate Member on the Committee. To his left Mike Smith, his staff adviser. And to my right, Melissa Jones, my staff adviser.

As I understand it, we have two particular topics today. The first is once-through cooling in California's coastal power plants, then thereafter we'll take up avian issues associated with wind energy and electric transmission lines.

Mr. McKinney?

MR. MCKINNEY: Good morning Commissioners and Advisers. My name is Jim McKinney, I'm the Project Manager here at the California Energy Commission. I've been managing and coordinating the preparation of a series of reports for the 2005 Integrated Energy Policy Report series.

This is the second day of workshops and presentations, our staff papers we've prepared in conjunction with the 2005 Electricity Environmental Performance Report.

As I mentioned yesterday when we were talking about general environmental issues associated with power generation in California, we identified several major topics this year that we felt merited further investigation by teams of consultants and staff.

Once-through cooling at California's coast power plants is one such paper. This is an issue that's been on our radar screen with which we've been working for a number of years now.

What we've intended to do with this paper is really compile all that we know here within the staff and again in consultation with some primary consultants, and combine that with some policy options for consideration by our Committee as they move through a number of issues on the environmental front.

The basic agenda for today is that we will be moving once-through cooling issues. This afternoon we have another set of presentations from staff on the avian impacts associated with

wind power and electric power lines in California.

The paper that we prepared and the major presenters here from our team will be the staff from the California Energy Commission, Moss Landing Marine Laboratories, and Industrial Economics. And we'll talk more about those folks a little later.

Let me do a few housekeeping items before we get into the presentation. One, we tend to move right through the agenda. Our Commissioners and advisers always have the discretion to ask questions from the dais.

We ask that stakeholders and other audience members hold their questions and comments until after the staff presentations. We have bathrooms out at the far corners here. If you need to go outside please don't use the far doors because you'll set off the alarm and everybody will know that somebody's done a no-no.

I don't know when exactly we'll be finishing, 12:30, 1:00 is my guess, but again we'll just try to get moving through this.

We've got three major sections here for this morning's presentations, first are the staff presentations, and I'll be kicking that off.

Second is a panel discussion. We have seven members, six, from different agencies, industry and environmental organizations, to offer their points of view. And I'll issue them more specifically later on.

And again the third part will be more of an open discussion with the audience and stakeholders.

Let me just set the basic framework here for once-through cooling. It's a cooling technology used by well over one-third of the power generation fleet in California. We've identified 21 power plants on the coast that total almost 24,000 megawatts. This is a critically important part of our fleet in California.

Those plants using once-through cooling, we have the two large nuclear facilities on the central and south coast. We have a number of steam boilers dating from the 1950's, 60's and 70's ranging up and down the coast. And then we have the newer combined cycle plants, and those are the ones that have been re-powered, in five cases that we've considered.

It's a very, very efficient cooling technology. California seawater is quite cold, so

it's an efficient way to remove the heat from the condensers as we go through the power generation process.

if you're at all interested in the history of energy infrastructure development in California, as I am, you'll know that it's really water that has driven the location of two of the mainstays of California's energy infrastructures.

The first of those is a hydro fleet, which was really developed in the 20's, 30's, 40's, and 50's, in the Sierra Nevada and some other key watershed areas. And the second was the availability of cool seawater for once-through cooling for our big baseload power plants. Initially those were oil-fired, and now they've all switched over to natural gas.

So that's why, as you drive up and down the coast, and you have some favorite spots, and you see a big power plant, now you know why it's there.

As with a lot of the infrastructure associated with energy production in California, again this particular set here we're talking about dates from the 50's, at that time seawater was the least desirable of the waters available for power

plant cooling.

Inland potable waters were deemed to be more valuable for other uses than was seawater. We really had no scientific appreciation for the types of impacts that we've grown to understand now.

I think a lot of you who may or may not be familiar with this issue have kind of a basic understanding that it's the near shore ocean environments, our bays and our estuaries, that are really the most biologically productive, and therefore the most sensitive ecologically of the ecosystems associated with ocean and estuarian resources.

There's really been an evolution in our scientific understanding of these ecosystems and how human activities, including power generation, can affect them.

I started my career at PG&E in the early 80's and did a lot of permit work at Pittsburgh and Contra Costa in the San Francisco Bay Delta. I worked on the power plants on some of the permitting issues and just kind of noted that the studies were set up for entrainment to really look at striped bass, that was the species of concern

in that particular area.

Now we know that it's really one of the most sensitive parts of the estuarian waters here on the western coast of North America. We have a number of endangered species and we've got a lot of tough issues in that area.

But at the time it was really a focus on commercial species, that was the first stage in the evolution of our scientific assessment of the impacts of these power plants.

In more recent years the understanding and then the concern about the general impacts to marine and estuarian ecosystems has evolved and grown, and there have been a number of major reports and studies that are putting this in a very dire light, that there are near-collapses or major reductions in some of the major fish stock in the oceans on both coasts.

A lot of pollution, and this is some of the main drivers here, or contributing factors, have been over-fishing, pollution, development, and non-point source runoff. And a key scientific question for us is what's the relevant contribution of the impacts from once-through cooling from California's coastal power plants to

this big five or six set of stressors to coastal ecosystems.

And I would say that in the last five or six years there's been a major convergence of science, regulation and policy around this issue. In the last few years we've had two major national reports, one is from the US Commission on Ocean Policy, the other is from the Pugh Ocean Commission.

Again, both of their findings have been somewhat dire, that there is cause for concern about the state and health of our near-shore ecosystems, and again some of the main things they cite are collapse of both commercial and non-commercial fish stocks, widespread pollution from a number of sources, non-point source runoff, a variety of other degrading factors.

At about the same time the US Environmental Protection Agency, which administers and promulgates the Clean Water Act, has also been studying this issue, and they have recently finalized a major rule change to 316B of the Clean Water Act.

That's the part of the Clean Water Act that looks at and regulates entrainment. That, in

California, that Act is administered by the State Water Resources Control Board as part of their NPDES, or National Pollution Discharge Elimination Service regulatory programs.

More recently, the state of California has also become quite active on this issue. So in the late 90's we had two acts, marine life management and protection acts. I think both of those were focused on marine reserves rather than a wholesale look at ecosystem effects.

Last year the Schwarzenegger Administration helped work through the Ocean Protection Act, and this year established the Ocean Protection Council. And I've got one of the quotes here, there's a lot of good quotes in those reports.

But one of the goals of the Ocean Protection Council is "to increase the abundance and diversity of aquatic life in California's ocean, bays, estuaries and coastal wetlands."

The way they seek to do that is to assemble a working group of all the major state agencies, with both regulatory and scientific information to bring to bear on this set of issues.

Staff on the Energy Commission attended and monitored the first of these in May, and then one of our managers, Mr. Paul Richins, attended and presented at the one just a few weeks ago.

It's quite an impressive array of agencies. It's the first time in my career, when I went to the May one, that I have ever seen executive directors of six agencies in one room, along with members of the state legislature and other senior officials.

It's quite an impressive array of agencies, and I think a lot of good work will be done through that.

One of the main things that came out of the Ocean Protection Council implementing act was that we needed better coordination of state agencies and programs. And again that's something that we hope to contribute to today.

The Energy Commission has been quite active in this area for a number of years. At the plant level, we've been pushing for site specific studies and also working to improve our understanding of the baseline conditions out there.

Our Public Interest Energy Research

program, or PIER, has provided \$1.5 million to the Moss Landing Marine Labs on the central coast, again as a research center to help study this issue.

Since 2001, when we did the first of our Electricity Environmental Performance Reports, we raised this as an issue of concern from the staff level, and encouraged our agency to continue doing the work that we could in that context.

Again, as I said earlier, the purpose of this white paper is to compile the work that we've been doing over the last few years. One such project has been a plant by plant study of the sufficiency or adequacy of the studies needed to determine effect or non-effect.

And Dr. Michael Foster of Moss Landing Marine Labs did that study and really looked at all 21 plants, and he'll talk more about that in his presentation.

Since 1999 we've also wrestled with five re-powering cases, where our staff and our Commissioners have really had to work to integrate in this evolving scientific understanding of a set of issues that are becoming to be understood as quite serious, but balance that with the context

of the energy crisis and de-regulation and the need to get new power plants online and really take advantage of all the investment that's been coming through as a result of deregulation.

It's been hard work. And as I've gotten to know agency staff in some of the other agencies I've been coming to understand that they are also wrestling with this issue, how do you integrate new scientific understanding into existing regulatory programs?

And again, I think the Ocean Protection Council will be a positive venue in which to do that type of work.

COMMISSIONER GEESMAN: I don't quite understand what you meant by balancing it with the energy crisis and deregulation, and I think you said something about investment flow. I -- I'm not clear what you have in mind there, Jim.

MR. MCKINNEY: Well, this is what I offer as my perspective, that as these cases came up and we were wrestling with how to assess and address the impacts from once-through cooling, that we also have the context of the power crisis.

And to me that's lent a certain level of urgency to work through issues and find the right

balance between resource adequacy, societal needs, and protecting the environment. That's what I intend by that statement.

COMMISSIONER GEESMAN: Okay.

MR. MCKINNEY: So the purpose of our paper and workshop today, I've talked about quite a bit of this already, so to summarize, we want to present a summary of our understanding of the scientific impacts associated with this set of issues.

We also want to integrate what we've learned about this issue into the broader scientific understanding of impacts to ocean and estuarian ecosystems. We want to coordinate our actions with those of our other agencies at the state and federal level.

And at the end of our staff presentations we have developed an offer for consideration by the Commission and a number of policy options.

We talked about the agenda already, but at this point, as I finish my presentation I want to identify the next series of speakers.

The first will be Dr. Michael Foster of the Moss Landing Marine Laboratories. He's been

one of our primary consultants on this issue, and he'll talk quite a bit about the science and what we've learned to date about this.

Ms. Caryn Holmes is is counsel here at the Energy Commission. She's going to talk about legal issues.

Mr. Robert Unsworth is the President of Industrial Economics of Cambridge, Massachusetts. He'll talk to us about economic issues associated with the resource economics perspective on this.

And then Rick York, who is the Supervisor of our Biology Unit, will make a presentation on the alternatives to once-through cooling and then offer up these policy options.

Following that we'll have presentations from our panel of stakeholders, and then again open it to comment from the audience.

So, with that, unless there are more questions from the Commission, I'll turn it over to Dr. Michael Foster.

MR. FOSTER: I think Jim gave a quite nice overview of what's going on statewide and nationally in terms of concerns about the degradation of estuarian systems, so I won't go back through that.

My main purpose is to discuss information related to the magnitude and scope of these sorts of impacts. And most of that information comes from work that I did reviewing the impacts, or the studies that have been used to assess impacts of the existing 21 coastal power plants.

In addition I've been involved in most of the new impact assessments associated with re-powering projects, as well as re-permitting as a result of some of the Regional Board and Coastal Commission work.

So the question becomes in all this, there are these major impacts to marine systems, the systems are to some extent degraded, and the first few things listed there in black are things that people commonly recognize as contributing to these ocean impacts.

And the question really is how about once-through cooling? So I'd like to use the background that I've gained from this experience and give you my perspective on what I think the studies to date show.

As Jim pointed out, there are 21 power plants, and they are permitted to use about 17

billion gallons per day, and they're roughly broken down into the categories I show here, in terms of habitats they will draw water from -- coast, sand and rock; coast, sand and harbor; and bay estuary.

And they're distributed throughout the state, but there are clusters. You can notice the cluster in the San Francisco Bay Delta Region, and as Jim pointed out, this is a particularly sensitive area, and one wonders what the cumulative effects of those plants would be beyond their individual effects.

In addition, there's a cluster down in the Los Angeles region, down in the little insert on the map, and again, beyond individual plant effects are the cumulative effects on the ocean that we should be worried about.

So just by way of background, what are the sort of impacts of these plants. This is using Diablo Canyon as an example. They have three sorts of impacts, two of which are associated with the intakes.

The intakes draw in the seawater, and they usually screen out larger organisms, anything larger than 3/8ths of an inch in general, and

those organisms are referred to as organisms that are impinged. And they die generally and are lost in the system.

Everything smaller than that, than 3/8ths of an inch, passes through the screen and goes to the plant, where -- and there's some debate over this -- but the general feeling is that one assumes 100 percent mortality of all that material that's entrained that goes into the plant.

So that material then comes out and as a result the water's been heated, usually somewhere around 20 degrees fahrenheit but sometimes less, and then discharged. And those impacts are referred to as thermal impacts.

This is sort of a schematic diagram showing that you have everything being entrained, the larger organisms removed on the screens are impinged, and then everything smaller going in, which we refer to as the real entrainment, through the power plant, where they're heated up, subjected to turbulence, sometimes the residual bio fouling agents, removal agents, and then that material is discharged back into the ocean at around 20 degrees or less.

Now there are some possible technologies that could reduce the impacts of these once-through cooling systems, and Rick York will talk about those.

There are also technologies that completely eliminate them, by going to alternative cooling systems, and Rick will also talk about those later.

COMMISSIONER GEESMAN: You suggested that there's some debate as to the assumption of 100 mortality from impingement?

MR. FOSTER: That's true, from entrainment, from the thing passing through the plant.

COMMISSIONER GEESMAN: And what are the dimensions of that debate?

MR. FOSTER: The debate is that if you do studies on the materials that are being discharged, let's say you capture organisms out of the discharge that have gone through this heating and turbulence and put them in tanks, and look at how long they survive, in many cases they'll survive two, three, four days, however long the study runs, okay.

The problem with that is that is not a

major of the survivorship of those organisms in nature. That is, what you really need is a study that says samples near the discharge but not under the influence of it looks at natural organisms that haven't gone through the plant and compare their survivorship with those that have.

And the sense is that, given the destruction those organisms go through, even if they do survive in a tank for a few days, they may, if released into the natural environment, die very quickly, either natural mortality or be subject to predation or, those kinds of things, because they're not in very good shape.

COMMISSIONER GEESMAN: And have their been any of those latter type of studies?

MR. FOSTER: Not a single one that I know of. Almost all the studies have looked at short-term survivorship in the laboratory.

COMMISSIONER GEESMAN: Is that a study that could actually be structured and conducted?

MR. FOSTER: I think parts of it could. It's a very difficult thing to do, because these are small organisms, okay.

COMMISSIONER GEESMAN: Sure.

MR. FOSTER: But I think if you got some

creative people together you might be able to figure out some way to look at them.

So we, in current entrainment assessments, assume 100 percent mortality. And I personally think that's not a bad assumption, although there is debate.

COMMISSIONER GEESMAN: And is there, if you could be subjective, is there a consensus among scientists in this field as to whether that 100 percent mortality is a good assumption?

MR. FOSTER: All I can tell you is that in, I guess now five of these new assessments that I've been involved with as part of technical working groups either for the Energy Commission or for Central Coast Regional Water Quality Control Board, the technical working group -- which includes industry and environmental groups -- have never questioned that.

Well, it's been questioned, but always allowed to go through. So, to me that means that, given that it's collected knowledge, there's not enough information out there to suggest that other than 100 percent mortality isn't reasonable.

COMMISSIONER GEESMAN: Thank you.

MR. FOSTER: Sure. So let me briefly

talk about thermal impacts. This is an infrared image from the Diablo Canyon nuclear power plant showing the distribution of the thermal plume and the various temperatures.

And modern technologies have made it really quite easy and inexpensive to track these thermal plumes, find out their average distribution, where they contact the shores, as well as track their thermal distribution with depth.

And so modern thermal studies can be quite precise in terms of where the impact is occurring, and then structure sampling programs accordingly. That's not always been the case in the past.

But given that, and what we do know from the sites that have been studied well, is that thermal impacts are very site specific. And they're particularly strong or high in areas where the thermal plume contacts a rocky bottom and kelp and so forth; or in enclosed waters, as you might imagine.

For instance, a good example is a recent study just completed at South San Diego Bay Power Plant, and the thermal impacts there are hundreds

of acres of eel grass loss, and I think it's because it's an enclosed body of water.

And this is just an example. This is Diablo Canyon on the left, it's before the discharge of low intertidal zone, very rich, diverse kelp area, lots of animals. And then on the right afterwards.

Impingement is sort of in the same category. The results suggest that it's very site-specific, depending upon the characteristics of the intake and where the intake is.

And as yet I don't think people have really figured out exactly what's causing the differences in all cases, but it is site-specific. But it can be large.

In the recent Huntington Beach assessment we looked at the total cumulative impact of all the impingements from all the power plants in southern California, and it turns out to be about 8 to 30 percent, depending on which sport fishing database you use, of the sport catch.

But of that, 90 percent of that is actually due to San Onofre Power Plant, so that's where most of the impingement is occurring. So I won't say anything else about thermal or

impingement impacts unless you want to ask me something.

And what I want to focus on for the rest of the talk are entrainment impacts, those organisms left over after going through the screen and going through the plant.

And I think what people did not realize when these plants were being built, or did not fully appreciate, is that cold slough and estuarian green waters are really habitat, they're not just water.

There's a huge diversity of organisms that live there, either as adults or as juvenile stages of things that eventually grow up to be adults.

In addition there is this assumption of the limitless ocean, which is not unreasonable if you come out from Kansas and go to the coast, it looks pretty limitless.

We now know that a lot of the organisms, their larval distribution and so forth, and their adult distribution, are in fact fairly restricted. So rather than a limitless ocean what you really have, relative to our plant entrainment, is about a strip of coast, right around the coast, out to

about maybe 300 feet deep, where most of these organisms and most of their life stages occur.

See, you're not actually withdrawing water from sort of an unlimited source. It's actually a fairly restricted source.

What sort of things occur in the water? Well, there's an amazing diversity of things. I've used "SPP" here to designate number of species, and then just "number" as number of individuals per 1,000 cubic meters of water.

And most of these data come from recent entrainment studies. You can see, for instance, just from fight or flight, there's on the order of 100 species and on the order of a billion individuals per 100 cubic meters of water.

In the zooplankton category, where most of the concern is, you have an array of things from adult, small organisms, which as adults are very small, like coccopods (sp) for instance, millions of them per 1,000 cubic meters, and then you have a larvae of things, like crabs, clams, mussels, kingsfish, so on and so forth, which is abundant and is also quite high.

For example, if you take these data here for fish, 44 of the 200 species have been found in

entrainment studies and numbers ranging from 400 to 600 per 1,000 cubic meters. If you took the average of that, and you say "well, how many fish does that represent consumed by 17 billion gallons of seawater every day?"

Well, it turns out, if you multiply 1,000 meters squared by 10 to the 5th you get roughly 17 million gallons. If you do the math it comes out to roughly 50 million marine and estuarian fish entrained every day, the larvae of those fish, and that could be quite significant.

Part of the concern over the effects of these power plants has come from more recent impact assessments which are slightly different, at least in their interpretation, than the earlier ones which were done mostly in the late 1970's or early 1980's.

Traditional sampling for entrainment impacts, one sample that the intake and in many cases the flow in the intake and in many cases the discharge of the sample, a number of problems with that.

You count the number of fish larvae of different species you can identify in those samples, and then, using information on the life

history of those fishes, make an estimate of how many of those larvae, what percent of those larvae would have grown up to be adult fish.

And this is the so-called AEL, or adult equivalent loss, or you can also calculate the number of adult females that you would have lost from the population, their fecundity, their reproductive output, which is called FH or fecundity hind casting.

In any case, that is what is done. Generally, mostly for commercial species. And then, those number of adults were priced according to their worth to the commercial fisheries, which was usually quite small.

And that was essentially the bulk of the entrainment impact analysis. And so, as I mention in the last part of the little yellow box, how about impacts to other species? They essentially weren't assessed, because it was thought to be impossible to do it, there were no really good methods.

More modern sampling, samples the intake in particular ways to be as unbiased as possible, but also the surrounding water, the so-called source water. And they use various mathematical

relationships and models to determine the proportional mortality of the larvae themselves that can be identified, that is what proportion of the larvae are entrained and actually killed versus the number of larvae that could be entrained, so-called PM.

In addition, they use other information to determine the area of that source population for each species, and the areas vary quite readily, because, as you might imagine, certain species have longer larval lives, so they might come from further away, so on and so forth.

And so that allows you to look at the proportional mortality. Now we can take that one step further and say well, what's the average proportional mortality of all the species we can assess, and what's the average area of the source population.

And if you multiply those two together you get an actual area, which we refer to as habitat production foregone. It represents the actual amount of habitat that's 100 percent lost as a result of the entrainment.

And so if we assume that we, the suite of fishes that we use, their larval distributions

are representative -- and that's not a bad assumption -- of the crabs, abalone, everything else that's entrained, then that number actually becomes an estimate of the total ecosystem loss due to the entrainment.

So, for those reasons, even though this is a new measure and still subject to some debate, I think that it is at least much more representative of what's actually being impacted.

As an example, let's assume you had a power plant estuary and entrainment study found that the average proportional mortality for the species examined was 17 percent. And let's assume that all those species came from the estuary and it's about 2,000 acres in wetted area.

That would be the source water, and all the species come from that, so it makes this calculation simple, since all have the same source water.

And so the habitat required to compensate for those losses, which is essentially the new estuarian habitat needed to produce the number of larvae equivalent to entrainment losses, would be the product of those two or of 340 acres.

One thing nice about this is it also

avoids endless and often not very fruitful debates about what's adverse by regulatory definition, what's significant by regulatory definition. These issues re extremely difficult to resolve. This is a number that says it's likely that that's the amount of habitat that is eliminated.

On top of that I mentioned earlier the potential for cumulative impacts. And these sorts of analyses re really in their infancy, in fact the first one ever done as far as I know in California was done, required by the Energy Commission, for the recent Huntington Beach study.

And so the question there is what are the additive impacts of these plants? And I just give an example that we've used, that we've developed in conjunction with the El Segundo case.

And that was, there are some data on Santa Monica Bay -- this is Santa Monica Bay -- giving circulation rates and so forth. And so from a strict volume ethic basis you can ask what percent of a water that circulates in Santa Monica Bay, a near shore water, is actually entrained by these power plant.s

And -- this is a very preliminary analysis, but it suggests that it scatters from 4

percent, El Segundo from 3.4, Redondo Beach 5.3 -- . You all all those up that's around 13 percent of the water per every six weeks. So that could be a fairly major impact. A lot more work needs to be done in his area.

So what do the recent studies show? I made up this little table that summarizes some of the data in the report, and I list the original study, at Moss Landings for Moss Landings, Morro Bay, Huntington Beach, Diablo and South Bay.

And they all, except Diablo, which was not a reliable study, all concluded no adverse impacts.

Recent studies at these sites have concluded the information on the right, in terms of habitat loss, using this habitat production foregone method, and you can see that it is considerable.

We don't have the modern impact studies at all of these plants. So what I did, down below here, is said "well, let's look at all the bay and estuarian plants." Their total intake volume is about 8.39 billion gallons a day.

In the studies at Moss Landing, Morro Bay and South Bay, it turned out that about 1.3

acres were lost of estuarian habitat per million gallons a day entrained. And for studies at Moss Landings, Energy Commission developed estimates of sort of the average cost of restoring an acre of estuarian habitat.

So if you do the math there, if all these plants were roughly similar to the three we have studied, that's about 11,000 acres. That's twice the amount of total habitat in Elkhorn Slough and Morro Bay combined, two nationally recognized, sort of jewel estuaries in the state.

And if you accept the valuation here, to restore that would be over a billion dollars. Now, as Bob Unsworth will point out during his talk, this is really not the benefit in the economic cost/benefit analysis, you cannot use that to balance against exactly the cost of, say, dry cooling.

But nevertheless it's a measure of the worth of that habitat if you had to restore it, the cost of restoring that habitat.

Okay, so there have been eight recent assessments, and that leaves 13. And, in my opinion, the existing assessments of those 13 power plants, as I discussed in Appendix One, are

not very accurate.

One reason they're not very accurate is that many times the methods that were used in those studies would no longer be acceptable today. We simply learn about the biases associated with some of these old entrainment sampling methods and use new methods instead.

In addition, many of the old assessments were not done at the particular plant, they were done at one plant and then it was assumed that that plant deserves the proxy for a bunch of other plants. So the individual plant was actually never assessed.

And perhaps equally important, they're very out of date. Again, as Jim pointed out, we're now becoming very aware of the degradation in near-shore estuarian ecosystems. Fish populations have changed, habitats have changed, due to the old data.

Even if they were accurate, would they be representative of the environment as it exists today.

COMMISSIONER GEESMAN: I guess that raised the question in my mind, you mentioned that there are 13 plants left. Those eight that you

characterized as modern studies won't look so modern next time the NPDS permit comes up, will they?

MR. FOSTER: You know, I think that one would have to, first I think the eight, unless there's some amazing new science discovered, presuming their methods would be acceptable, and the question would then be how much has the environment changed?

And at least that's something we can now assess. There's enough monitoring going on by both Fish and Game in terms of fish stocks, and by other groups in terms of intertidal systems, that I think we can at least say yes or no.

And I think that, in many cases it may be that some of the plants would not need to re-do a study, because there'd be no reason to think that the study they did was not representative.

COMMISSIONER GEESMAN: Okay.

MR. FOSTER: So, clearly, if we're going to have an overall assessment of the importance of these impacts near shore systems, we need to know what the impacts are. And so I think the first order of business is to ensure that these studies get done.

The other thing I want to point out is that assessment is not, in my mind, a regulatory issue. Even though there are various regulations, and Caryn Holmes will talk about these in a minute, that govern impact assessment in these habitats and for these sorts of facilities, the fundamental science required to do it properly is pretty much the same.

And so it's very unfortunate, however, that that fundamental science has not been well articulated and commonly used amongst agencies. So, in my opinion, the consistent study approach, when you do these impacts and interpretations and are finally reviewed by unbiased experts -- and that's not just to keep me making my kid's tuition for college, okay -- it's, it turns out that these are very technical studies, from the sampling to the interpretation.

And at all stages there is an incredible scope for bias. And sometimes that bias is very unconscious. And we've found, again we've experienced with recent plants, that a technical working group, some kind of group that involves all parties as well as some independent scientists who are expert in this area, has really helped

sort out what's really going on.

Some in the audience may disagree with that, but it's my opinion.

So I would take the question mark off the once-through cooling and I would say that, based on what we now know, that it can be causing major impacts. And I think then the question becomes what can the Energy Commission do to better understand and reduce the impact from once-through cooling. And Rick York will make some suggestions about that in his final talk.

COMMISSIONER BOYD: I've got to take advantage of the opportunity to ask you at least one question that we have to deal with when you're trying to mix science and policy decision.

And given all that you know and we know about the situation, given an opportunity to have a limited amount of money and do a cumulative impact study of a large body of water versus maybe a detailed study of a single point source or intake source amongst many, what would be your scientific druthers?

MR. FOSTER: You know, I think it's actually not a terrible monetary decision. It turns out that the cumulative stuff, the basics of

it, is fundamentally oceanography. So it really is not so much concerned with the actual entrainment study of an individual plant, but it's more concerned with the circulation and distribution of water with organisms in the immediate area.

And that work would not be terribly expensive, it just needs to be done. And so then you use that in conjunction with, I think as a priority certainly the work at individual plants needs to be done, okay, I would list that if it was actual choice of money.

But I think both can be done, and one feeds into the other. And I think it would be a nice combination. And particularly there's an opportunity now, with the new 316B regulations, when the plants are close together it may also be possible that the same sort of study does not need to be done at each one.

For instance, source water sampling, which is very expensive and intensive, if they're both using similar source water that might be combined. So there's some economics of scale in the studies themselves. So I don't think it would be that bad.

COMMISSIONER GEESMAN: Electricity generation, obviously a major source of entrainment in these coastal waters. Are there others that you'd characterize as major sources? Refineries or other industrial facilities?

MR. FOSTER: Again, we looked into that for Huntington Beach, and the overall view was no. There are, even marine labs withdraw some seawater for use in their seawater systems and public aquaria. Desalination plants are the question marks.

But in terms of other existing sources, they're all relative to once-through cooling minor, very minor. Tom at the Coastal Commission might have some comments to make about the leaking of desalinization to once-through cooling, and how that might extent the lives of these plants in terms of their once-through cooling, but as a source right now, no.

COMMISSIONER GEESMAN: Thank you very much.

MR. MCKINNEY: Commissioner Geesman, in answer to your last question that you posed there, I know in the San Francisco Bay Delta estuary the pumps at Clifton Fore Bay, which are the main DWR

pumps, are also a main source of entrainment for that ecosystem.

COMMISSIONER GEESMAN: And do you have a rough quantification of how those pumps compare to a power plant?

MR. MCKINNEY: I do not, but I know that CalPED has been doing a lot of work on that, and I don't know if any members of our panels from the various agencies might have the answer to that?

I'd like to introduce Ms. Caryn Holmes, the staff counsel here at the California Energy Commission.

MS. HOLMES: Good morning, I'm Caryn Holmes, I was asked to put together a brief summary of legal requirements affecting permit and operation of once-through cooling facilities.

I've worked in my capacity as staff counsel on the Morro Bay case, and I did some work on El Segundo and I also have helped the Commission post licensing on some issues associated with Moss Landing.

As you can see from the list up on the screen, there are a lot of legal requirements that apply to projects that use once-through cooling. There are more in fact than are listed here, but

these are the major ones.

And what I'd like to do this morning is just try to run through them quickly and explain how they are related to each other.

The first one that I started with is the Warren-Alquist Act. That's obviously the piece of legislation that gives the Energy Commission jurisdiction over power plants that have generating capacity of 50 megawatts or greater or modifications to existing facilities that result in a 50 megawatt or greater increase.

The Energy Commission's licensing process has two major components. It requires us to conduct a CEQA analysis as the lead agency, and it also requires us to make specific findings on projects conformity with local, regional, state, and federal laws.

With respect to this latter requirement there are specific additional requirements for projects that are located within the coastal zone and within the San Francisco Bay that come into effect when projects propose to use once-through cooling.

CEQA, as many of you know, employs the lead agency concept. The permitting agency is

required to conduct a review of potential environmental impacts. The lead agency is required to impose mitigation or alternatives if there are significant impacts identified, unless those measures are unfeasible.

If they are unfeasible and the Commission decides to nonetheless license the project it must make specific findings in writing that the project benefits outweigh the impacts that have been identified.

The important thing for considering once-through cooling under CEQA is that CEQA uses a baseline concept of existing environmental conditions, and that means that, to the extent that for example on a re-powering water use, it's going to decrease or remain unchanged.

The baseline is the existing level of water use, and we wouldn't be looking at the reductions and impacts, we would only be looking at impacts if there were increases.

Now this baseline concept is fairly simple to understand in terms of longer term impacts. For example, do you want to look at whether or not water use has increased over one year or five years or ten years. When you start

to get into the shorter time periods trying to capture seasonality impacts it gets a lot more difficult to do.

And the Commission has struggled with this a little bit in some of its decisions.

COMMISSIONER GEESMAN: Is there a standard approach to defining a baseline?

MS. HOLMES: The Commission has used a five year annual number for looking at long-term impacts. I don't believe that short-term impacts were explicitly considered in the Moss Landing facility.

In the Morro Bay facility the Commission looked at pumping limits rather than historical data, and I'm not familiar enough with El Segundo to know how that was considered.

COMMISSIONER GEESMAN: And how does the five year calculation compare with the approach taken in other states?

MS. HOLMES: I don't know the answer to that.

Another important piece of legislation is the Porter Cologne Act, which establishes state water policy. It's implemented by the regional boards but gets picked up when the regional board

do their permitting under the 316A and B permit requirements that you've heard about earlier.

One of the key elements of the Porter-Cologne Act is a requirement that intake and mortality be minimized to the extent that's feasible. And regional boards are required to address that requirement when they issue their permits.

COMMISSIONER GEESMAN: And the permit they issue is the federal NPDES permit?

MS. HOLMES: It's actually a state permit, but yes, it's issued under the federal NPDES permit system. And they address a series of issues having to do with point source and non-point source, as well as the 316A and B requirements that come into effect when you have a cooling water intake structure.

COMMISSIONER GEESMAN: Okay, they revisit that every five years?

MS. HOLMES: They're supposed to revisit that every five years. In reality a number of permits go on to what I believe is called administrative extension for many years, many years. I believe that -- Chris can probably answer this question more accurately than I can --

but I believe that, for example the existing Morro Bay permit is at least eight or ten years old, and they've been on administrative extension.

COMMISSIONER GEESMAN: So is the requirement for minimization of intake and mortality a one time requirement when a plant is initially permitted, or is it a moving target that is revisited every five years?

MS. HOLMES: As a state policy it's supposed to be revisited every time they issue a permit decision.

next is the federal Clean Water Act. We've heard a lot about this already. The Clean Water Act requires NPDES permits for a whole range of sources, including ponds and non-point sources. It gets quite confusing, having to do with distinctions between points and non-point and existing and new.

But for purposes of this talk what I'd like to focus on is the 316A and the 316B requirements.

316A imposes specific requirements relative to the thermal discharge that you heard Dr. Foster talking about earlier. Those typically have not been a major issue in power plants that

have been licensed by the Commission.

In contrast, 316B requirements, which impose certain standards on cooling water intake structures have proven a little bit more difficult to deal with.

The 316B requirements are implemented by the regional boards as part of the NPDES permit program. They require what's referred to as best technology available for minimizing adverse environmental impact, and a key concept here is that there is not baseline requirement, unlike there is with CEQA.

You don't have to look at what the existing water use is and compare what's proposed under the NPDES permit to the existing. It's a requirement that applies in the absolute.

The standards for implementing best technology available have been a subject of controversy and litigation. For many years there was no published standard, there was a lot of case by case determinations.

As a result of a consent decree that arose out of litigation in the 80's EPA has issued rules for new facilities and then more recently they've issued rules for existing facilities.

That was early last year; there's been at least one lawsuit filed against EPA regarding those standards by environmental groups, and I believe there may have been another one filed by a coalition of eastern state Governor's, but I'm not as certain about that.

The new standards that were promulgated last year require reductions in impingement and entrainment. The standards provide four compliance options that permit seekers can use.

One of them is a site-specific determination. There are specific data submission requirements -- and again you heard Dr. Foster refer to this -- there's much more guidance now than there has been in the past in terms of the kinds of studies that need to be presented.

There need to be study plans that are approved ahead of time. The data collection I think is going to be much more consistent across permit applications as a result of this.

There are measurement requirements in terms of determining compliance with conditions that are imposed on the NPDES permits so that there are, there's going to be a fairly standardized way for the implementing agencies to

evaluate whether or not the projects are meeting the requirements of the permit, and what the effects are of the various measures that are being employed.

An important factor is that restoration is allowed. In other words, as you heard Dr. Foster discuss earlier, in terms of providing compensatory habitat it is permitted under the new rules.

This is a subject that's somewhat unclear, however, as a result of litigation regarding permits issued under the new rules where, in some instances, restoration is not allowed. So we'll have to see how that develops. I suspect it will take some time.

The next rule that I'd like to focus on is the Coastal Act. The California Coastal Commission has a special role in our licensing project.

They are directed to prepare a suitability report that addresses a number of specific issues, and the Energy Commission is required to include the provisions that the Coastal Commission identifies as necessary for meeting Coastal Act consistency, unless the

Commission specifically finds that those measures are unfeasible or would cause greater environmental harm.

There is also a specific Coastal Act provision that requires minimization of entrainment effects and enhancement of restoration and marine resources.

And as people know who have been following Energy Commission siting cases involving once-through cooling, that's been a subject of much spirited discussion in our recent cases.

There are also unsettled issues regarding the effect of the conclusions of the Coastal Commission on consistency with coastal policy.

And by that I mean the Commission has to make specific findings with regard to consistency with the Coastal Act. In the last couple of cases the Commission has found that measures recommended by the Coastal Commission were unfeasible or caused greater environmental harm.

And there was an unsettled question as to whether or not that means that the Commission then makes an independent determination with the Coastal Act, and if it does whether or not

additional specific findings need to be made.

There is also an act called the McAteer-Petris Act, which applies to the San Francisco Bay. It's similar to the Coastal Act in terms of the process in which the Commission's findings get made and get folded into a Commission Decision, but that Act does not have specific policies directed at once-through cooling in the way the Coastal Act does.

And then finally there are other legal requirements that can come into play. For example there are federal endangered species or state endangered species. There are consultation requirements. There can be additional permit requirements that are imposed as well.

if there is something that's referred to as essential fish habitat, consultation with the National Marine Fisheries Service is required as well. So there are a series of requirements that can all come together into a single permit, which makes it fairly complicated at times, to deal with all of them.

In conclusion I just wanted to say that it's not easy to draw a single conclusion that's applicable to all of the projects in California.

Depending upon the type of source water, depending on the location, depending on the type of species that are affected, different sets of requirements can apply.

There has also been different levels of analysis and data that have been required for different projects. I am hopeful that with new rules in effect there will be more consistency in the future in terms of data collection and in terms of monitoring what permits are issued.

I'm also hopeful that the different agencies that have different roles will be able to work together, particularly with respect to the new Ocean Protection Council that's been established by the Governor.

So, a lot of the issues that I've mentioned today are going to require litigation to resolve, but I think a number of other ones will be amenable to resolution in a non-litigious fashion. At least I'm hopeful of that.

Questions?

COMMISSIONER GEESMAN: Thanks, Caryn.

MR. SMITH: Caryn, excuse me, I do have one quick question. going back to your 316B slide --

MS. HOLMES: I had several.

MR. SMITH: That one.

MS. HOLMES: On the requirements?

MR. SMITH: Yes, the new requirements.

Is there not a potential waiver of these requirements if compliance could be demonstrated to be unfeasible?

MS. HOLMES: That's, well, that's really the fourth compliance option. If there's a certain level of economic infeasibility then you can get a site-specific determination where basically you do the best you can, you come as close as you can to meeting these requirements.

There have not been any permits that have been issued under the new, under the new Phase two rules. And again, I think this is one of the issues in terms of how the compliance options are going to play out.

Unfortunately, I think that's one of the issues that's going to end up being resolved through litigation.

MR. SMITH: Thank you.

MR. MCKINNEY: Thank you, Caryn. For the third in our staff presentations I'd like to introduce Mr. Robert Unsworth, who's President of

Industrial Economics, and he's going to talk to us about some of the economic issues associated with assessing once-through cooling.

MR. UNSWORTH: As noted, I've been asked by the Commission staff to talk for a few minutes about the modernization of the ecological effects of once-through cooling, which Mike Foster talked about earlier, as well as some economic issues which I think arise within the context of once-through cooling.

And this is going to be an overview first, and then more detail.

I start with the premise that, given the substantial cost of switching to alternative technologies or retrofitting systems or, in the case of the new, potentially the new 316B rules, the mitigation of impacts, that it's reasonable to consider the magnitude of economic benefit that might result from a reduction of the impacts of once-through cooling.

But my analysis has concluded that, despite the fact that economists and biologists have been staring at this problem for a couple of decades, there is no conclusory evidence of what the monetary impact is associated with biological

effects.

There's nothing that's comprehensive or reliable that we can fall back on. And in short we know a lot more about the cost of avoiding these effects than we do about the benefits.

And given that we don't know much about the total effect of once-through cooling, in a monetary sense, we also don't know as much as we probably should about the marginal benefits that might be achieved through additional requirements to reduce those effects.

If you review the literature and the policy studies that have been done to date, those studies have generally focused, as do a lot of resource economics problems, on things that are easily valued. So we know more about recreational and commercial fishing losses than we do about other types of losses that I'll talk about today.

And we also know more about how much it might cost to mitigate for these impacts, based upon studies that have been done to date for things like constructing wetlands to offset the impacts on fish populations of entrainment.

No analyses, however, to date have successfully placed a total value on impingement,

entrainment and thermal effects of power plant operations in California. And in general, even though studies have happened, it's my opinion that the standards of economics haven't been consistently applied.

The EPA, within their 316B rulemaking, did expend considerable effort trying to place economic values on the impacts of once-through cooling. They did a number of analyses, including analyses of non-use values, using benefits transfer, and they also looked at commercial and recreational fish impacts.

But in their final rulemaking, based on input from OMB and PIER review panel, the only numbers that were presented as part of rulemaking related to recreational and commercial fish, both direct impacts and indirect impacts, and they did not present in their final rulemaking materials on other sorts of effects.

Those are the broad conclusions I reached. I'm going to step back a little bit here and talk about the categories of impacts we're talking about, and a little more detail about why I think we don't know enough today.

In general, when economists are asked to

place values on ecological change, whether it's due to once-through cooling or due to any environmental perturbation, we think in terms of the services that have changed from environmental resources.

And a variety of categorizations are out there which can be used to describe those services, and to help understand what sorts of techniques might be available to place a value on them.

This is one that I've borrowed from the literature. And basically it breaks ecological benefits into use benefits and non-use benefits.

Use benefits are things that we can observe in the marketplace or for which we can observe people's changes in behaviors. Non-use benefits are things where we can't observe people's changes in behavior, but where we might hold a value for the existence of an endangered species, for example, and still have no intention of ever going it and seeing it or consuming it.

Within use values you can further break those into direct use values and indirect values. Direct values would be things like the bottom commercial fish harvest, recreational harvest, and

indirect values would be the value we hold for species habitat in order to promote populations of fish that we hold some commercial value for.

And then within direct value you can further break it into market and non-market. And the purpose of this slide is to highlight that most of the effort has been placed on the bottom two circles, which are market and non-market effects, and in particular on commercial fishing and recreational fish harvest.

The other categories of impact have been less well studied and understood.

Economists have a bunch of methods available to us, a bunch of tools that were developed in other contexts from once-through cooing, and they're well accepted and widely applied to let us get at some of these techniques.

Market methods, which involve looking at products which trade in the market, things like markets for commercial fish products, where we can observe transactions and reveal preference methods, which involve looking at people's changing behavior in response to a change in the environment or the choices they make in choosing different sorts of places to recreate.

And finally, state of preference methods which are more controversial which involve asking people through surveys about how they might respond to a change in environmental quality or what they'd be willing to pay for a change in environmental quality.

And those stated preference methods are typically undertaken in situations where we can't observe behavior because the conditions that we're looking to value don't exist today.

We can apply these methods through primary research -- going out and doing a study -- or through secondary approaches, which involves drawing information from the existing literature. There's a substantial existing environmental economics literature.

And in fact in the EPA's Section 316B study they did both of these, they did some primary work with some data they had on market impacts on commercial fishing, and they also attempted to perform a benefits transfer to get at some of the existence values for species, the non-use values.

Despite the availability of these tools, and these tools have been around since the late 70's, nobody to date has successfully conducted a

study of the total value the public holds for avoiding the ecological effects of once-through cooling.

And part of that is due to the fact that until recently we didn't understand the biological scale of that effect, and so you can't evaluate it. But it also has to do I think with the fact that the regulatory process hasn't pressed it to date.

My report for the Commission staff also highlights economic issues that arise in the context of once-through cooling that are related to application of equivalency based approaches. And these are the habitat production foregone approaches that were talked about earlier. They're also referred to as habitat equivalency.

And habitat equivalency based approaches are being widely applied in a variety of contexts. It started in natural resource damage assessments being used in other examples of environmental perturbation, like NPDES permitting, and it's being used both in the US and overseas.

And basically these approaches are premised on the idea that we can compensate for ecological impacts that we observe by undertaking

some sort of mitigation which will provide a similar flow of services to offset those impacts.

And as Mike Foster noted, there's been some past applications of these that have implicitly or explicitly assumed that the costs of this mitigation have something to do with the value the public places on that mitigation.

And I think particularly Americans confuse price with quality. In this case I think a lot of analyses have confused cost with value. An example would be if you had a large shade tree in your yard you may value that for the shade it provides and the attractiveness it provides to your home.

But if it's destroyed by a lightning bolt and a landscaper tells you that it's going to cost \$100,000 to put that same tree back and have it look exactly the same, you might not be willing to pay that. The cost of providing that tree has nothing to do with the value, it has to do with the production process to bring that tree to your home.

And I think in this case the outstanding question is the one at the bottom here, which is "Is the public willing to pay for these

environmental offsets, and are they greater than the cost of those actions?"

This will be particularly true, in my experience, as habitat equivalency, provided it is applied. It typically is applied in a manner that gets more and more rigorous through time, and the expectations of what sort of mitigation will be required go up and the costs go up.

So the conclusion I reach from looking at these equivalency basis is that, while it's not capable of developing a measure of the value that the public places on once-through cooling impacts, it can provide the means of establishing the scale of restoration required to offset the impacts of the cooling.

So it does have a purpose as a possible alternative to more engineering compliance. However, the applications to once-through cooling in California and also in the US have generally been pretty simplistic.

There aren't a set of well accepted standards that have been developed to date for application of these techniques, and as a result it runs the risk of arguing on a case-by-case basis what sorts of assumptions should be made,

and one of the proposals I have is that a set of criteria and processes should be established for application of equivalency based approaches for once-through cooling.

Having drafted the paper that's in the report, Mike Foster and Rick York said to me "well, that's all nice, but what is the economic impact of once-through cooling." And -- not an uncommon response to economic analyses.

And what I've put on the chart here is an attempt -- these numbers differ from the report because in this case we're trying to standardize them as much as possible, we're trying to place them in the same year dollars, do present values assuming the same discount rate, etc.

And you get different numbers, and, okay, what can we learn from this. The blue bars are cost estimates of mitigation. The orangish bars in general are commercial and recreational catches, the top one being EPA's estimate of the economic benefit of reducing impacts of once-through cooling in California.

They developed an estimate specific to California. The bottom one is Diablo Canyon, a site-specific study. And you might stare at this

and say well, what can we learn from this. And the bad news is we can't learn much.

As I mentioned first, the blue bars are not valued, they're not comparable to the orange values, they're cost, and they represent the cost of taking actions to offset impacts.

The second is that these are not, the techniques are not applied in a consistent manner. In the case of the EPA rule it's for a specific reduction in once-through cooling impacts. It's not for a unit reduction. And so it's difficult to draw much of a conclusion at all.

And I think it's even hard, as you look across them, to see the consistency of their --, given the size of the plant.

And so that's the next slide here, it summarizes their conclusions. Can we look to studies that have been done elsewhere in the US and have been done to date in California to determine what the economic impact is?

No, we really can't. There hasn't been enough consistency or completeness to those studies.

Can we look at the Section 316B estimates developed by EPA? And I think, given

that EPA in their final determination for the rulemaking dropped most of their benefit categories, I don't think we can look to that as a complete measure.

I think the recreational and commercial impacts are probably reasonable measures.

And can we apply the environmental enhancement cost estimates? We can in the way Mike did, which is to understand what it would cost today to replace the ecological impacts they may have caused, but we don't know whether the public would actually be willing to pay that much if it showed up on their utility bill.

And as a result, as I noted at the beginning, we can't place a total economic value. And more importantly, from a regulatory perspective, because we don't know the total economic value we're unlikely to be able to report what the public would be willing to pay for a marginal change of impacts, based on what we know today.

So the conclusions I reached were that methods do exist to assign economic values. However, those methods can only apply to a limited set of benefit categories, and the manner in which

they've been applied have not consistently met the standards for good economic analysis.

Equivalency methods have the potential to provide a sound means to scale restoration to offset the impacts of once-through cooling, but the cost estimates you generate from those assessments are not a measurement of the public's willingness to pay.

And that's important, because as I said, as requirements become more stringent we may reach a point where we're overinvesting in reducing the impacts of once-through cooling.

And then the last bullet there, which is I think a standard one, which is that the economic analysis is only as good as the biology. And, as Mike mentioned, some additional work is needed on that.

You asked earlier "well, with limited resources, what would you invest in?" The first thing I would invest in would actually be the second bullet here, which is I think that a detailed guidance and a public process to allow comment on how equivalency approaches should be applied across sites in a consistent manner and what data requirements are for the application of

equivalency approaches is sorely needed.

Mostly to avoid arguing about assumptions on a case by case basis, and to generate some consistency.

Secondly, it would be the first bullet, which is I think that, given that these costs will show up in people's utility bills, and given that the costs in the long run could be substantial, I think that more primary research is needed on how much the public is willing to pay to avoid these effects.

And that research would be premised on understanding the ecological effects, so that understanding would have to come first. But that would be important research as well.

COMMISSIONER GEESMAN: I want to make sure I understand what you said about EPA's methodology. You stated it several different ways, several different times, but I think the conclusion that you wanted us to draw from it was that EPA had been limited in the benefits that they assess, but that their assessment was analytically sound of those limited benefits?

MR. UNSWORTH: Well, actually it's sort of, more of three parts as opposed to two. They

were very broad in the category of benefits they considered. Their report looks at a wide range of benefit categories.

Having gone through all that and having generated numbers, the rulemaking only relies on direct and indirect commercial and recreational fishing benefits between the period they receive their own internal review as well as OMB comment they dropped their other analyses, and in my opinion some of the benefits transfer analyses they did for the studies they don't meet the standards of good economics so they appropriately dropped them.

The portion that they did value and present, I think those models are relatively sound. They are premised on some biological assumptions that I am not an expert in, but the way they did the economics is relatively sound.

COMMISSIONER GEESMAN: So, based on that limited analysis, EPA set rules, you're suggesting research presumably that we and arguably other state agencies would be interested in pursuing, I presume that the focus of that research or the application of that research would then be on plant-specific decisions that we made?

MR. UNSWORTH: That's right, you're correct in that EPA place the requirements and deploy, although those are being challenged and in particular the ability to use mitigation as opposed to engineering solutions.

But, yeah, the application would be to requirements that go beyond or come sooner than EPA's requirements.

COMMISSIONER GEESMAN: And you would contemplate that analysis being applied to both new facilities and existing facilities when they came up for regulatory review?

MR. UNSWORTH: That's correct. And I think it also would be reasonable to apply it to the fleet of facilities that you have in the fleet right now.

COMMISSIONER GEESMAN: Yeah, that's what I was trying to get at. So, potential retrofit requirements?

MR. UNSWORTH: Yes.

COMMISSIONER GEESMAN: Okay.

MR. UNSWORTH: Until we get into siting issues, that's probably the most important.

COMMISSIONER GEESMAN: Okay.

COMMISSIONER BOYD: I just want to thank

you for your presentation and for, what shall I call it, your candor with regard to the state of the science, and I felt very familiar if not uncomfortable with your description because it sure reminds me of sitting through a lot of siting cases and dealing with the data stew that we have to deal with.

So, and my eyes went immediately to your second bullet before you said that was your first preference, so I'm glad to see that we are supposed to practice the art of economics, at least we agree on that point. So, thank you.

MR. MCKINNEY: Thank you, Mr. Unsworth. Let me cue up our next presentation here.

Okay, Rick York, who is the supervisor of our biology unit in the Environmental Office, is going to talk about the issues you see here.

MR. YORK: I'm going to give you a broadbrush idea of some alternatives to once-through cooling, and also talk to you about some potential measures that have been applied. Some work, some don't work to help minimize impingement and entrainment impacts.

I need to thank Joe Higgin for this presentation, unfortunately you're stuck with me

giving it today because Joe was not able to join us today.

So, I know just enough about some of this to be dangerous, but I hope I'll give you some good information today.

So, as far as cooling alternatives, the one you've heard probably a fair amount is dry cooling as an alternative to once-through cooling. Under most circumstances dry cooling can totally eliminate the need for cooling water.

We have eight operational power plants that use dry cooling in California, and we have permitted three of them. Actually, only two of them are operational right now, that's the Sutter Power Plant up in Sutter County, and the Crockett facility in the San Francisco Bay Area.

The Otay Mesa project is permitted and is under construction, but it also is a dry cooling facility.

Dry cooling, as you'll see, has some problems with it, there's some additional costs and that sort of thing, and also on the hottest of days dry cooling in some ways can suffer a bit.

What the PIER program and others have discovered is that there are some possibilities

using some hybrid systems involving cooling towers and spray enhancement that can make these facilities even more efficient and cost-effective.

There are higher capital costs and operating costs when you compare a dry cooled facility to one that uses cooling towers. These dry cooled facilities can be quite large. They can be noisy at times. They require a lot of space. And they can also pose visual concerns to local folks living near it, close to these facilities.

There are capacity losses that can be associated with them; however, this can be adjusted for by having a larger condenser, which does up the operation costs and the capital costs, but you can lower the capacity losses by making those adjustments.

But even with these higher costs and capacity losses these facilities can be quite competitive.

Another cooling alternative is going to cooling towers. The use of recirculating cooling and cooling towers can substantially reduce the amount of water that's necessary even when you're using seawater.

Some of the water options. Seawater can be used in cooling towers. Wastewater effluent can be used. And other sources can be those that are unsuitable for municipal and water agricultural uses. So there are a variety of water options that can be used in cooling towers.

For use of cooling towers there are smaller capital costs when you compare it to dry cooling, but when you compare it to you once-through cooling there can be efficiency losses and a significant amount of water can be evaporated if you use cooling towers. So there's water loss there.

Cooling towers can be more expensive than once-through cooling, but cooling towers are feasible in California, because the vast majority of inland power plants use cooling towers.

There are concerns, air quality concerns, the visibility of the plume on various cool, moist days, and the disposal of the blow-down. These are all concerns related to using cooling towers.

As far as alternative cooling water supplies, as I mentioned, wastewater effluent can be used which, if it is applied, is a way of

totally eliminating the need for ocean water for cooling, which eliminates the impacts associated with once-through cooling, impingement and entrainment.

We propose the use of wastewater for cooling for the El Segundo power plant project because the Hyperion wastewater treatment facility is quite close to that project, which is in the Santa Monica Bay area.

There are advantages to these cooling water supplies, these alternative supplies. The proximity of the cooling water supply can be a major concern, and whether or not the owner of the water is willing to provide the cooling water.

So, employing something other than once-through cooling has its obviously benefits as far as we're concerned. However, if once-through cooling is going to be used there are some other things that people have tried, some things work and some don't work, to reduce the associated impacts associated with once-through cooling.

You've heard that habitat restoration is something that could be utilized to try to offset the effects of a coastal power plant. We have employed restoration requirement of compensation

funds for restoration on the Moss Landing Power Plant case, and the money went to the Elkhorn Slough Foundation.

So far the conclusion is that this has been very a successful requirement for that particular power plant, which the Energy Commission did license.

And you also heard others mention that at the federal level there are challenges for use of restoration as a mitigation measure. But in California, for our CEQA analysis, habitat restoration is something that is allowed.

You can also go to actual flow reduction to reduce your impacts. And in particular re-powering is a way of going to a power system that requires less water.

Combined cycle combustion technology uses significantly less water than a typical steam turbine power plant.

A good example is the Moss Landing Power Plant, units six and seven, to produce 1,478 megawatts requires 600,000 gallons per minute for cooling while the new units, units one and two, are capable of over 1,000 megawatts but only require 250 thousand gallons per minute.

You can also go to variable speed pumps as far as reducing the flow. This is something that I'd like to see happen on many of the facilities in California. I don't believe variable speed pumps are on many facilities.

It's a way of reducing the amount of flow that's needed each day, each month, each week to produce the power. It's a way of ramping down the amount of water that you need, depending on how much power is necessary or not necessary.

In the Delta Region variable speed pumps, I believe, have been used at either Pittsburgh or Contra Costa or both facilities, to implement measures to reduce the amount of water that's necessary to protect the local fisheries.

And for Pittsburgh the cost of the variable speed pumps was in the lower \$6 million. Going to some sort of flow reduction scheme is a way of reducing impingement and entrainment impacts.

There are other potential measures that have been developed and implemented to reduce these impacts. Locating your intake in deeper water instead of in a local bay or estuary can be an effective way of reducing impacts. However,

some people also conclude that you're just changing one problem for another.

There are various design and technology options that have been tried at various places, some work and some don't appear to work very well.

I'll be giving yo a little bit of information about velocity caps, travelling screens, wedgewire screens, aquatic filter barriers, and some behavior barriers that people have tried.

In California, for the deepwater intakes I think it's fairly common for the facilities to have what's called a velocity cap. And having a cap on the intake has been shown for Huntington Beach project -- and I'm sure it can be demonstrated at others -- that there is a dramatic decrease in impingement problems for coastal facilities that have a velocity cap on their intake. But this doesn't help with entrainment problems.

You can employ the use of travelling screens. Like velocity caps, travelling screens tend to be fairly standard on coastal power plants in California and travelling screens can reduce the amount of impingement if they have finer mesh

screens on them or various add-ons that have --
I'll talk to you about fish buckets and these
sorts of things.

The travelling screens can dramatically
help in reducing the impingement problems that
these facilities can have. It doesn't do
anything, it doesn't help much on entrainment.

As far as the new federal regulations,
what they're looking for there is a half foot per
second velocity through these travelling screens,
and if they are able to demonstrate that then they
will be able to meet the new federal regulations
for reducing their impingement effects under the
new Phase 2 regulations.

Notice the smiling fish. Some
travelling screens. The fishdrop (sp) screen is a
sophisticated option or improvement for these
travelling screens, where you have, as the screens
move they collect the fish and they dump them into
a fish return system.

Some of these systems are relatively
expensive. San Onofre has a \$200 million system,
I'm not sure it's this type. Once again,
travelling screens with fish return systems and
buckets and that sort of thing do not help

entrainment impacts.

A relatively new technology that we don't have in California yet, but it's been employed to a limited extent on the east coast, that does help impingement and entrainment are systems called wedgewire screens.

And the EPA has determined that this is the best technology available, but it's only limited to freshwater situations -- rivers and streams.

Limited use in the United States, they are expensive. We don't have any of them in California. There's also some uncertainty as to whether or not they would be useful in a saltwater situation. But as I mentioned, wedgewater screens can be a technology that does help limit impingement and entrainment.

Aquatic filter barriers, you probably heard the name Gunderboom. Gunderboom Incorporated has developed a marine life exclusion system technology, a series of fabric that's suspended in the water and this is right now considered by EPA as just a very experimental.

It can, if it works, help within limits the impingement and entrainment effects. It was

proposed for Contra Costa, but it was determined before it was even tried to be infeasible. There's concerns about fouling, the stability, and the high costs of maintenance are significant problems.

We may see an open ocean deployment feasibility study completed for the El Segundo power plant case.

There are some other things that have been tried. Certain types of behavioral barriers involving sounds and lights and bubble curtains and these sorts of things. Poppers, rock music, these all have been tried -- loud rock music.

Only limited success for these various things, good try, but what success they have had have been rather species specific and don't appear to work for very long if they do work at all.

I apologize for this table having too many numbers and columns, but I did want to give you some sort of idea of the relative costs of adding some of these facilities, they are expensive in some cases.

However, if you compare dry cooling to variable speed pumps you can see some sizable difference in costs there. And as I mentioned,

variable speed pumps are one of these things that could make a pretty dramatic difference if employed properly in impingement and entrainment impacts.

The wedgewire screens, as yo can see, ar quite variable in their price. Some of the wedgewire screen technologies tried in California under seawater situations.

So, in summary, I've pointed out that there are some alternatives that can greatly reduce or eliminate impingement or entrainment impacts, but there are concerns about some of them. Increased costs are just one of them.

There are cooling alternatives that are being used and that are feasible. We can use, as I mentioned, variable speed pumps and other things to reduce the flow of water and to reduce impingement and entrainment effects.

And we do want to point out that habitat restoration has been tried in California and has been successful and may have more of that in the future.

And I'll take any questions.

COMMISSIONER GEESMAN: Thanks, Rick.

MR. YORK: And you're not done with me

yet. I have another talk to give. If you want to fire that one up.

COMMISSIONER GEESMAN: Mike?

MR. SMITH: Rick, I do have one quick question for you. Going back to your slide -- you don't have to show the slide, that's okay. Where you talked about the hybrid systems.

MR. YORK: Correct.

MR. SMITH: You mentioned it in the context of dry cooling and cooling towers. Has there been any talk given to a hybrid configuration using dry cooling and once-through cooling?

MR. YORK: I think Joe Haggin and I talked about that. Obviously didn't mention it here today. Did mention that cooling towers and once-through cooling is a possibility. Is that the type of hybrid system --?

MR. SMITH: No, I'm thinking more in terms of at a coastal site where you have an existing once-through cooling system there may not be space big enough for a footprint of a dry cooling system that could accommodate the entire cooling requirements of the plant, but you might, is there the possibility of a downsized dry cooling

system in conjunction with the once-through cooling being used to meet the peak cooling requirements?

MR. YORK: I think that's definitely an option. I would love to continue to talk about the various options, and I'm sure there are some various combinations that are out there.

I was unable to attend the cooling alternatives workshop that the PIER program put on. I was preparing for these workshops and other things, and I understand that the meetings went very well and a lot of good ideas were discussed and I look forward to reading the proceedings from that workshop.

And I really wish Joe Haggin was here this morning.

MR. MCKINNEY: Jim McKinney here, I'm the moderator for today's session. We very much welcome those of you listening by telephone, and would like to remind you that everything that comes through your telephone set transfers here to our Commission room.

We've got a lot of people kind of wondering what the background sounds are. If I could ask you to use your mute button or otherwise

be quiet until it becomes time for a public comment. Thank you.

MR. YORK: When I was preparing for this part of the presentation I realized that I was being put into a position to talk about some of the to me some of the more fun things, some ideas about how we could do some things better here.

I also realized I was putting myself in a position for getting yelled at possibly too, so work with me on these ideas.

You've heard about the new California Ocean Protection Council. The Energy Commission staff has already been working closely with this new group. We do feel that there is great opportunity here for the Commission to work closer with this Council.

It provides a great forum to develop statewide policies for, you know, addressing some of the concerns that we've discussed today. And we've attended two meetings already. We actually were asked and did present a Powerpoint presentation on once-through cooling at the June 10th meeting.

Paul Richins attended for the Commission and did a fine job and I believe he got yelled at

a little bit, but it wasn't too bad.

So, idea number one, work closer with this new Ocean Protection Council.

If you were in attendance at yesterday's workshop or in 2003 you learned that the Energy Commission adopted a new policy about conservation of fresh water use for power plants.

Another suggestion here today is that we have a new policy regarding once-through cooling. I've provided some suggested language here. Lots to shoot at here, but we think this is something that we'd like the Commissioners to consider in the 2005 Environmental Performance Report and IEPR cycle.

COMMISSIONER GEESMAN: So if I'm reading the language correctly, you would suggest that such alternative water supply sources or cooling technologies be utilized unless they are both environmentally undesirable and economically unsound.

So that if they were environmentally undesirable but economically sound, where would that leave you?

MR. YORK: We'd like to talk to you about that word. We set the bar pretty high here,

and we understand what we've done. I think we've tried to understand what we've done with all these policy ideas, but that is a tough test, and we understand that, but we thought the language here was a starting point.

COMMISSIONER GEESMAN: Definitely a starting point.

COMMISSIONER BOYD: Definitely a starting point, yeah.

COMMISSIONER GEESMAN: I guess the question that I would raise, and I don't know if I've got my numbers right, we're either talking about 23 or 31 existing plants, and if I understood the discussion with Caryn correctly, those are plants whose permits under the NPDES system are revisited every five years.

Is it right for the focus of state policy in this area to be focused on those plants that are proposed for re-powering, and presumably carries with it other environmental benefits, such as air quality perhaps, or should the state policy be directed at all 23 or all 31 plants?

MR. YORK: 21.

COMMISSIONER GEESMAN: 21.

MR. YORK: That's a great point, and I'm

not going to try and answer it.

COMMISSIONER GEESMAN: Well, I'd certainly be interested in anybody else's thoughts on this topic between now and the fall when we put out our draft committee report. I think you made a quite compelling case this morning about the need for the state to take on a much more sharply focused policy initiative here

But I'm not certain that I see the logic in confining ourselves to only those plants that happen to come before us for new licensing certificates, particularly when there's regulatory leverage over all of the plants and these questions ostensibly should be revisited every five years.

MR. YORK: Well, we only felt comfortable focusing on those where we actually had some licensing leverage over. If you wanted to carry it out farther that would be great.

COMMISSIONER GEESMAN: I think that's worth thinking about.

MR. YORK: Maybe there's the possibilities for creating some sort of financial incentives to provide the use of some of the alternatives, and this is one that, I don't know

quite how to do this.

We'd like to see the Energy Commission possibly explore some financial incentives and to promote the use of some of the alternatives. And -- I'm a biologist, so forgive me on how I'm going to phrase this, but maybe some of the alternatives, if project owners are willing to change to an alternative cooling alternative maybe there's ways of recovering the cost of that through long-term contracts and those sorts of agreements.

I know we don't set rates in California any more, but this was something that we discussed and said let's go ahead and put this one out there, maybe there's ways of making it financially attractive to change cooling technologies.

If you folks on the dais have ideas, we'd love to hear.

COMMISSIONER BOYD: I'm looking forward to see what our panel's reaction is to this later.

MR. YORK: One of the things that we're working on now already is updating the data accuracy regulations. I obviously have been focusing on the 12 month regulations for biological resources and we'd like to provide a

much broader spectrum of discussion about the types of studies and the data that we need for our power plant siting analyses.

And we have various versions that do that. We're looking forward to working with you on the actual language that is adopted if the data adequacy regulations are changed. I think this ties well in with the new 2005 MOA we have with the Coastal Commission, and this is with regards to the need for the applicant to provide a discussion of the projects' compliance with the Coastal Act and the need for current site-specific analysis of entrainment impacts.

So I think this is a good fit.

One of the things that we mentioned earlier is that there is some data gaps out there for us and others to have a better sense for the overall individual and cumulative effects of these projects.

We'd like to first off suggest that we require that these applications when they do come to us have current impact information, make that a requirement. And we may also want to try to adopt a standardized impact analysis protocol, which we are working on right now, that we could apply to

siting cases.

And also share with applicants in prefiling meetings, if they attend, if they dare come to us with a project involving once-through cooling.

We're working with a variety of consultants that do these studies. Right now four applicants to develop this more standardized protocol and recommendations on how, what should be done to determine the impacts of these projects.

And this protocol paper may be available this fall. It's also the intention to publish this protocol in a scientific journal, as well as be available here as a Commission publication.

Still dealing with this issue of not having adequate information, we'd like to see that impact analyses be done for the roughly two-thirds where they seem to be some significant data gaps.

We could focus on the nine power plants that are in the Santa Monica Bay Region, if we wanted to focus our attention. And also the Bay Area would be another area to focus on if we wanted to choose.

We'd like to also work on identifying

alternatives in some of these regions, cooling water alternatives, and work to see if there's ways of getting these projects to take advantage of some of these alternatives.

Some of these studies, or all of them possibly, could be coordinated through our PIER program contract with Moss Landing Marine Labs, and particularly if we were trying to do a cumulative effects, an adequate cumulative effects discussion and analysis.

Something Caryn mentioned earlier and others have said, we'd like to have sort of a standardized approach to the regulations and policies with all interested stakeholders. We'd like to suggest maybe updating the Memorandum of Agreements and understanding with the state regional water boards and the Coastal Commission to develop a consistent regulatory approach to once-through cooling.

And also the determination of the best available retrofit control technology. We would hope this standardized approach would create a little more seamless regulations and policies and their application in regards to once-through cooling.

And we do believe that if we were able to have this more standardized approach, unified approach, that other state and federal agencies are likely to want to participate.

I'm available for anybody's questions.

COMMISSIONER BOYD: Well, I have two comments. You didn't mention one of the actions with this Commission with respect to Santa Monica Bay, which was in a particular power plant application, to get the Santa Monica Bay Restoration Commission, if I've got the name right, engaged and involved in a look at Santa Monica Bay and a cumulative impact study, which is one thing that's going on in terms of maybe pushing the frontier a little bit more.

My other comment is, in the informational comment, with regard to your talk, your bullet point here about the State Water Quality Control Board, recently we did meet with the Chairman of the State Water Resources Control Board to talk about 316B, coastal power plants, so on and so forth.

And I do know that the Chair of the State Board is engaged, he's either engaged with or chairing a national effort with his peers

throughout the country in working with USEPA on 316B requirements and what have you.

And I believe the Water Board has announced a workshop in the not too distant future on this subject in the general sense. So, another bit of evidence of, you know, working with sister agencies to try to move the process along, one that perhaps has moved with glacial alacrity in the past and may be speeding up a little bit.

Terrible climate change on there, but I won't -- in any event, that's just a couple of comments.

MR. YORK: Yeah, there is a September 19th workshop, I believe it's down in Long Beach, and we're planning to attend. We've been invited, so --. And that's being coordinated by the State Board.

And maybe Dominic Gregorio can elaborate on that a little bit more this morning as part of our panel discussion.

COMMISSIONER BOYD: Just one additional comment. I realized that, while you mention the Moss Landing habitat plan, there was no mention of the Morro Bay approach, which was another habitat restoration approach aimed at trying to help

facilitate some of the upstream problems that are contributing to the overall degradation of the estuary there.

And I'm just noting, on the economic model, and just thinking my way through power plant siting cases, I for one kind of think that when you're dealing with estuaries the model is far more complex than when dealing with the open ocean, even though both of them are extremely complicated. But that's just a personal observation.

MR. YORK: I think the plan is to now move on into our panel discussion. I'm not sure how we wanted to do this. We have representatives from Fish and Game, Duke, Coastal Commission, state Board, Santa Monica Baykeeper, and the National Marine Fisheries Service, and we've provide name tags so you know who they are.

And what we asked them to do was to provide five minutes or less, a comment about -- well, we wanted them to say anything they want.

But what we've got is an interesting mix here of folks that we have worked with on a number of siting cases and we thought they'd all put something into today's workshop, and they will be

available for questions after their comments.

If we want, I guess I could start it off by saying why don't we hear from Fish and Game here first, since you're at the end of the table there, Tim?

MR. MCKINNEY: Why don' we rearrange the room lighting here a bit. Do any of these panelists need audiovisual materials that they're going to need for their presentation?

Some of the standard questions that we ask for panelists or for audience are one, did we get it right? Are the facts that we presented in our staff reports right?

Secondly, is there anything important that we left out? Those are just two of the standard questions we have for folks.

And third, we'd be interested in a number of things. Your agencies or organizations views and works on this set of issues, and any comments you might have on the staff presentations and/or the policy options that were presented at the end of these.

And I agree with Rick, why don't we start with Mr. Stevens at the Department of Fish and Game, and then just work our way around the

table. And we will have to share microphones in a few instances.

Please be sure your microphone is on, and because this is a public workshop and we are on the record, again give your name and affiliation.

MR. STEVENS: Good morning, my name is Timothy Stevens, I'm an Environmental Scientist with the Department of Fish and Game, actually out of our region three, which is the Central Coast Region, and I note from the staff report that there are several power plants in our region, but today I'm speaking on behalf of the entire department.

I'm here today obviously to comment on the once-through cooling procedures commonly used in power plant facilities. Before I get into the meat of that I'd just like to comment on something that Rick referred to, and that's the behavioral barriers.

He mentioned loud rock music, I wondered if loud rap music might perhaps be better, or to be fair perhaps soft or loud folk music.

(laughter)

Over the years the Department, I

understand, has provided various comment letters about certain California power projects. We could make those comment letters available again I imagine again in the future.

As you know, the Department's mandates include advocacy for fish, wildlife, and public use of these resources, and their habitats. These uses provide commercial and recreational values to millions of Californians.

Obviously then I speak today as an advocate for fish and for wildlife. The Department naturally acknowledges the vital importance of various varieties of our California power plants -- coal and gas and nuclear and what-not.

However, we feel that the once-through cooling procedure is somewhat antiquated, and has been shown to have significant direct and indirect detrimental impacts on aquatic organisms, although obviously, as your own staff reports and acknowledges, we recognize that further information and further data is definitely needed.

We feel that these impacts are occurring particularly on fish and shellfish, which as I alluded to, have both commercial and recreational

values for millions of Californians.

These impacts, or these effects, result in harmful impacts to local and regional recreational and commercial uses, as I just said, not only for marine but for estuarian and freshwater habitats.

And for example, we have migratory species that go up and down our estuaries and then go into the freshwater habitats.

We believe, as your staff reports allude to, that water cooling operations impact valuable fish resources in at least four primary ways.

One, by impingement, that is the entrapment and destruction of organisms. The larger organisms are stuck to intake screens and eventually killed in the screen cleansing procedures.

Two, by entrainment. Smaller organisms, larvae, plankton, eggs, zooplankton and so forth are sucked directly into the plant and killed, mechanically or by the temperature therein.

Three, by the release of water in higher than ambient temperature situations. Many species, as you probably know, are sensitive to temperature increases. Higher temperatures can

cause direct physiological impacts but they also affect the amount of oxygen that is borne by the water and this in turn affects various species.

Four, by the release of potentially harmful chemicals, although again and probably for all four of these, we need further information definitely, as your staff referred to.

Both fish and organisms have direct specific value, as well as animals that serve for food for these directly valuable species, and are affected by all of these impacts.

Furthermore, these practices add additional stress to systems that we believe are already "sick" from other impacts unrelated to today's hearing, that is pollution, over-fishing, development, and things of that nature.

And again, as your own staff's reports refer to, these cumulative impacts are somewhat unknown at this point, but could be deleterious to an extreme level.

As the Commission considers alternatives to once-through cooling procedures, for example, dry air or open re-circulating systems, for future projects the department asks that the Commission remember the need to alleviate, to the extent

possibly, impacts to the state's precious and in some instances dwindling fish and shellfish populations. Thank you.

COMMISSIONER GEESMAN: Thank you very much for being here, and I certainly want to thank the Department for their participation in our various siting cases. Your input has been extremely helpful in developing our evidentiary record and I think leading to better informed Commission decisions.

MR. ELLISON: Good morning, Commissioners, my name is Chris Ellison. I'm an attorney, outside counsel to Duke Energy. Thank you for the invitation to address once-through cooling issues this morning.

Duke is the owner/operator of the Moss Landing facility, also the Morro Bay facility, and operates the South Bay facility under contract to the Port of San Diego.

My experience on these issues is confined to Moss and Morro principally, and so everything I say I think should be taken in the context of those two projects specifically, where the Energy Commission took what I think was a very deep dive on all of these issues, in the context

of those two power plants.

And I'm going to focus mostly on Morro Bay, not because I wish to drag myself and Commissioner Boyd back through all of that again, but because it's the one that I know about, and because I think it's a good proxy for a number of these cases.

It's a major power plant using once-through cooling in a very sensitive estuary, one of the 28 national estuaries in the country, certainly a very important marine environment.

I do want to mention before I go further that Duke is in the process of considering the modernization of the South Bay facility on behalf of the Port of San Diego. They're looking very seriously at a number of options down there.

Their preference at South Bay is to find an alternative to once-through cooling there. They're looking very hard at recycled water, and I hope to come forward with an application later this year, hopefully using recycled water rather than once-through cooling.

Having said that, though, I want to emphasize that Duke's desire to pursue an alternative to once-through cooling at San Diego

does not arise out of an agreement that once-through cooling has substantial adverse impacts, but rather out of a perception that there's a great deal more regulatory certainty with a recycled water proposal than there would be with a once-through cooling proposal.

I was on a conference call not too long ago when somebody, I think accidentally, coined the phrase "this is not rocket surgery."
(laughter)

I like that phrase. Once-through cooling and the impacts on estuarian environments is rocket surgery, okay. This is about as complicated a subject as I've run across in my professional career.

And I think that suggests a couple of things. One, the issues related to the impacts of once-through cooling are very site-specific, and I think it should very much be viewed that way. There's a great number -- as I think Caryn did a good job of mentioning -- there's a wide variety of policies that apply either to all projects or to subsets of projects in California.

But the specific impacts and the specific impacts of alternatives is very much

site-specific, and I think if you take one message away from me this morning it should be that these issues should be examined on a case-by-case basis.

I think there is some benefit to adopting standards, for example the suggestion on developing a standard for how you evaluate the economics and the economic benefit of restoration and that sort of thing. I think that recommendation has some merit.

But I think adopting another policy that would seek to define the scope of the alternatives analysis, for example, such as recommended by staff, is not a good idea.

I share some of the concerns implicit in your questions, Commissioner Geesman, about the specific wording of that policy. I think if that policy had been in effect during the Moss Landing case we would not today have the successful restoration of the Elkhorn Slough that the staff referred to.

I have a number of comments on the staff report. Let me begin by saying, in a moment I'm going to discuss some things that I think industry experts would disagree with in that report, but let me begin with some things that I think the

staff got right.

First and foremost, the idea that these analyses should be based on sound science is something that Duke certainly would agree with, I think industry experts would agree with. The technical working group process that was employed in the Morro Bay proceeding, we thought was an excellent process for focusing on sound science, bringing in outside independent experts from the Moss Landing Marine Labs, University of California Santa Cruz, California Academy of Sciences, and others.

There certainly could be disagreements about what that sound science exactly is, but these re scientific issues, and I think that kind of process is important.

The second thing I'd say that I thought the staff got it right and generally speaking did a good job and presented a good, balanced presentation of the alternatives to once-through cooling, and the discussion of some of the economic analysis associated with it.

I thought that, although industry experts might disagree with some of the numbers of some of the things that are in those sections, I

think that they would view it as a generally balanced presentation.

The issues with which I think not only industry experts would disagree with the staff report, but in fact this Commission, at least in the context of the cases that I'm familiar with, disagrees with the staff report.

I'm going to focus on three, very quickly. The first is the staff report, and to get this right let me quote it, at page one, attributes the impacts of once-through cooling "are contributing to declining fisheries and the degradation of estuaries, bay and coastal waters."

In making that statement the staff report attributes larval losses to the general population and the health of the estuary.

Now again, confining my comments to the cases I'm familiar with, the Energy Commission looked very closely at that, as did the technical working group, and there was I believe unanimity, and certainly the Commission's decision was, in those cases, that the larval losses, while significant enough to trigger Clean Water Act requirements, could not be extrapolated into findings of significant impact on either the

ecosystem generally or any particular adult population of the species.

There are a number of reasons, I think, for that. Some of them involve lack of data. It's very hard to attribute any impact to one specific thing in an environment where there are many different sets of impacts going on, and there certainly are specific impacts happening.

But there are also a couple of other things that I would mention that suggest that the findings of proportional mortality are not at all necessarily attributable to the larger population.

Given that we only have five minutes, let me just say a couple of things very quickly. The first is that, the way these analyses are done is through this sort of proportional mortality thing, and I'd be happy to answer questions about this, we could spend hours talking about it, but in the assumptions used in that analyses you can change the outcome dramatically, as I think you all understand.

And the one message that I would leave for you is that there's a great deal of difference between what, at least industry experts would consider sound science in trying to do the best

faith estimate you can do of the impact on the one hand versus trying to do something where you are being very conservative in order to justify mitigation, recognizing the uncertainties that exist in all the data.

So for example, Commissioner Geesman, you asked some questions about mortality rates. The Morro Bay Commission Decision has a very good discussion of that.

In that proceeding, 79 percent of the entrained species that were sampled were gobbies. The best evidence of the studies is that naked gobbies have a survival rate of 88 to 98 percent in the studies that Dr. Foster recommended, that Dr. Foster discussed awhile ago.

The mean average of all the species that have been studied for survival rates is greater than 50 percent. Nonetheless, all of the technical working group, as Dr. Foster correctly mentioned, including the Duke scientists and the Commission's Decision, agreed to use an assumption of 100 percent mortality.

That does not represent an agreement by industry scientists that that's the best estimate of the impact. What it represents is the

conservatism that is used in trying to make sure that the mitigation really does fully mitigate the impact.

In other words, what these decisions are doing is to consciously overstate the impact of once-through cooling by using worst case assumptions, and on the other side of the equation, to understate the benefit of restoration in order to be conservative.

And I think it's very important, in looking at these issues, that a distinction be drawn between estimates that are intended to be the best faith estimate of an impact versus estimates that are consciously conservative.

A couple of other indicia of the fact that larval impacts may or may not have an impact on the larger population specific to Morro Bay. The Morro Bay National Estuary Foundation, which was the non-profit association in charge of the restoration and assessment of Morro Bay, just prior to the filing of the Morro Bay application, had completed a year long study of what were the stressors of the Morro Bay Estuary.

And they identified seven key stressors, none of which were the power plant, which is

clearly the only entrainment source.

There are a number of other things I could go into, but the point is there is another side to this story. It's a side that the Energy Commission fully recognized in its Morro Bay Decision, it's Moss Landing Decision, but it is not as well reflected in the staff report.

The second place where I think both industry and the Energy Commission's own findings would take a different approach than the staff report is in the characterization that the industry's only concerns, or the only reason not to go to an alternative to once-through cooling involves cost.

And this I think may be the most important point. The Energy Commission Decision at Moss and at Morro Bay quite explicitly was not based on cost.

In the case of Morro Bay there was a rigorous review of the feasibility of dry cooling, for example, and it was determined to be very expensive and not to be feasible. But more importantly, it was also determined not, to be not environmentally preferable.

The Commission adopted once-through

cooling with a variety of mitigation measures, including a restoration plan, because they thought it was the most environmentally preferable thing to do for the estuary.

And I had intended to read you that part of your own Decision but in the interest of time I'm not going to. But it goes through in some detail how much the Commission believes that the habitat restoration program overcompensates for the impacts at Morro Bay.

And the reason that this is important is because if you are attempting to, in an area that is rocket surgery where there is a lot of uncertainty, if you are attempting to protect the environment and you don't care about anything else, put aside all the other considerations that I know you have to consider, but even if your goal is just to protect the environment, and even more specifically just to protect the marine environment, it is still not obvious that moving away from once-through cooling, if you assume habitat enhancement, is the best way to do that.

So, being excessively conservative, adopting a policy that says we're going to move away from it every time we can, may not be the

best thing. Again this is all very site-specific, but may not be the best thing for the marine environment.

And I would urge you to talk with the Elkhorn Slough Foundation, the Morro Bay National Estuary Program, and other similar organizations to get their perspectives on these issues.

Lastly, let me just conclude by saying I was a little surprised, I thought Caryn did a very good job of going over the legal principles involved in all of this and the various agencies, I was surprised to see the statement that there is no single agency that has jurisdiction over all of California's once-through cooling facilities.

I believe that the federal Environmental Protection Agency does, I believe that the State Water Board does, and I believe all of that can be quite consistently administered through the Regional Water Board, the various regional water boards.

And I believe that the EPA's regulations are an attempt to standardize the way all this is being done. Now, not everybody agrees with their approach, I understand that, California may want to do something of its own, I understand that,

there may be merits to doing that.

But the problem that we face is not a lack of policy, it's not a lack of law, it's not the lack of an agency with jurisdiction over all of these plants. There are a plethora of agencies, there are agencies that have jurisdiction comprehensively.

I think the main problem that we face is a lack of science, a lack of information, a lack of data. I think the most important thing that the Energy Commission can do is, perhaps through it's PIER program and other efforts, is to try and advance the science, advance the data, while dealing with these issues as they come before it, on a case by case, technically sound, technical working group kind of basis.

I was surprised to hear Dr. Foster say that he thought a study following up on the mortality impacts in the natural environment could be done. I have been told by experts that it's impossible to follow thousands of larvae in the natural environment to see what their fate is, and that even if you could, mortality, massive mortality is the natural fate of these larvae anyway.

So even if you followed them and they died off in massive numbers that wouldn't tell you anything. But if for example that's right, if for example Dr. Foster and other creative scientists can come up with a way of looking at that assumption, that would be an important contribution.

Thank you very much.

COMMISSIONER GEESMAN: Thank you for your remarks. I do have a couple questions. You emphasized that these are site-specific impacts and ought to be approached from that perspective.

And I recognize both Moss and Morro Bay were both relatively isolated sites. Do you see a value in performing a cumulative impact assessment in areas where there are more plants focused on a particular body of water?

Santa Monica Bay is one that has been put forward to us as a prime candidate for more of a cumulative impact assessment. Do you see value there?

MR. ELLISON: There may be value there, I haven't looked at the Santa Monica issues at all, so I don't want to make a comment that would be attributable to any specific situation.

I will say two things. One, cumulative impact is a phrase that I think is often misused, as it is intended in CEQA, which is the origin of it, as well as in NEPA, it is the examination of the impacts of multiple projects which individually might not have a significant impact but collectively might.

Used in that fashion, where you have multiple power plants in close proximity, I think that is at least a legally appropriate definition of cumulative impacts, and certainly there are baseline issues, and I'm not going to get in to all that, but that is to be distinguished from cumulative impacts as sometimes used here at the Energy Commission at least by some folks to mean something that I think is not correct, at least under CEQA.

Which is to take multiple impacts of a specific project which have been found to be insignificant, and try to group them together and call them significant, even though individually they cannot be called significant.

That's a difference, and that's a problem I think of at least legally improper use of the term.

As cases come before you, as individual cases come before you, you do have to assess the existing environment. And as part of assessing the existing environment, looking at the other power plants in the region, it seems to me, might be a part of that.

COMMISSIONER GEESMAN: I was not here for our Moss Landing Decision, but your comment about impact on the environment and the notion of dry cooling not always being the best alternative resonates with me.

I am concerned that, I think that our staff oftentimes seems to approach dry cooling as a one size fits all approach.

I was here, though, for the Morro Bay Decision when it came in front of the Commission. And it was an area, it may be beyond the scope of this staff report, but those of us that were here, I think we do recall that fairly vividly.

But I wasn't completely satisfied in the way in which the staff report discussed the noise or visual impacts, aesthetic impacts, of the dry cooling alternative in the Morro Bay case.

And I think that, although you focused your comments regarding Moss Landing on impacts to

the marine environment, if we're called upon to really conduct a balancing of sorts between different environmental values -- and I don't want to antagonize Mr. Luster, although I'd welcome his comments on the same topic when it's his turn to speak -- one of the things that arguably we are also called upon to do is apply the values of the Coastal Act to our decisions.

And I think the nature of the tradeoff that we need to make is one that considers the impact of dry cooling facilities in areas like Morro Bay.

And as the local residents were quite vehement in testifying before us, the adverse visual or aesthetic impact, and the negative effect on recreational values, which I know my colleagues and I hold to be pretty important environmental considerations, and pretty important aspects of the Coastal Act that we're called upon to carry out.

I recognize others differ in how they strike that tradeoff, and in the Morro Bay case the Coastal Commission appeared to differ as well, but I understand your points as it relates to the marine environment.

I think from my perspective, and specifically recalling Morro Bay, it's a broader question as well as far as whether dry cooling is the panacea to many of these issues.

MR. ELLISON: Let me just say, one, I agree with that. And two, let me just say this, that, regardless of how one assesses the impacts of once-through cooling, I think there's a general consensus that these older existing plants, even if they continue to use once-through cooling, can have those impacts substantially reduced and mitigated through modernization.

And I would encourage the Commission to encourage modernization of these facilities, and I would encourage you to be wary of requirements where essentially the better is the enemy of the good, where you impose a requirement on new facilities that has the unintended consequence of causing owners of these facilities to conclude that they're better off to just leave them as they are.

COMMISSIONER GEESMAN: Thank you very much.

MR. LUSTER: Good morning, Commissioners, I'm Tom Luster, I'm staff analyst

for the Coastal Commission. I'm actually here to praise you in part, a little different from our previous encounters.

I'd like to applaud your efforts first of taking an indepth look at this issue of once-through cooling. It's a subject that's very close to the Commission's interest as well. Also for providing your staff the opportunity over several years to really advance the science.

They've done a lot of work and hired some great consultants to dig in to this issue in great detail on a lot of the projects you've looked at. And I know the Coastal Commission is going to benefit from a lot of the work they've done.

I've provide a few brief points from the perspective of the Coastal Act and from various Coastal Commission findings. Most of these you've heard before, and many of them earlier today. So I'll be brief and leave plenty of time for your questions.

Basically, we look at once-through cooling as outdated technology that does create significant environmental impacts. You saw some figures today, about 17 to 18 billion gallons a

day of near shore and estuarian water being pulled through the power plants.

In an inland perspective that's about 51,000 acre feet, which is about 81 square miles of near-shore and estuarian habitat being pulled through the power plants every day. so that is a pretty substantial area along the California coast.

I would also think there are feasible and less damaging alternatives, you've heard about a number of those today. Again, this is all done on a site-specific and case by case basis, but we like to look at the default as there being something better than once-through cooling for many power plants.

For those power plants at which alternative systems aren't feasible due to space constraints, distances from alternative water sources, or other things, there are feasible measure to mitigate for those impacts.

While I agreed with a lot of what Mr. Ellison had to say, I do disagree on the issue of once-through cooling being seen as a mitigation measure perhaps, or adding mitigation measures to that may not be the best solution.

In CEQA and in mitigation policy in general the first step is to avoid an impact, and if by moving away from once-through cooling you avoid the impact that's the first step to consider.

If you can add compensatory mitigation to a once-through cooling system, that's a fine step, but that's further down the list. And it's also important to recognize the uncertainty in the science by perhaps not only considering the conservative nature of the studies but by applying mitigation ratios so that you're getting two to one, three to one benefits, just to ensure that the full package is overall beneficial to the environment.

I think we fully support getting the up-to-date entrainment studies as power plant proposals come before, again on a site-specific and case-by-case basis. I think one of the main things from today and the effort in your staff's report is the sense that the state and the various agencies and commissions can work together on these issues.

As I said earlier, I think we'll benefit from a lot of the work you and your staff have

done. I think there's an opportunity here to come up with comprehensive state policy that the State Board, the Energy Commission, the Coastal Commission and other involved parties can develop a consistent approach to power plant siting.

Perhaps it also applies to desalination facilities, which are going to be coming before the Coastal Commission. So that, as we deal with once-through or seawater intakes in general, people will have a pretty common understanding of certainty about the process that they'll be going through, a better sense of the end result that will be coming out at the end of the various reviews, and hopefully that's of benefit to the state.

There's one question earlier about desalination. The concern about it extending the life of a power plant. From what I've heard, the concern is not so much that a desal facility will extend the life of a power plant because, while desal does take a large amount of energy, it generally won't be the make or break decision on a power plant operator, whether to continue or not.

It's more the continuing use of the intake itself that we're concerned with. The

power plant will probably not be that dependent on the proposed desal facilities we see coming down the line.

With that I'll close and answer your questions.

COMMISSIONER GEESMAN: I'm curious that you mentioned projects coming before the Coastal Commission or siting cases coming here as important venues to visit these issues.

You didn't say anything about NPDES permit renewals. Do you see that as a production forum?

MR. LUSTER: Yes I do. In fact, we have been working with the LA Regional Board. They have started a working group on the new 316B rule and have been meeting with various stakeholders for about the last year and I assume will continue with that effort for awhile.

Trying to identify the status of the various studies and what needs to be updated and the various ways to implement the new requirements.

So yes, I see that as a very helpful way to coordinate on these things.

COMMISSIONER GEESMAN: What significance

would you attach to a cumulative impact study in an area like Santa Monica Bay? Is there value there, or are we simply chasing after something likely to be too elusive to really yield much?

MR. ELLISON: Actually I think there would be value there. I think your staff have done a good first step with the recent Huntington Beach report that came out. I think the Santa Monica Bay Area may be another candidate for that, San Francisco Bay, although that's out of Coastal Commission jurisdiction --

COMMISSIONER GEESMAN: Right.

MR. ELLISON: -- but I agree with Dr. Foster that the first step is to have a specific study done at each particular power plant, and then build on those results by combining that information to create a cumulative impact study.

One recommendation that came to mind earlier when we were talking about the various alternatives, the aquatic filter barrier and the screening devices, that sort of thing, it may be of use to look at those independent of a particular siting case in front of you.

If there is research money available to just look at the feasibility in a coastal

environment of those sorts of things outside of the process that you go through it may be easier to get through, basically, and may be of value.

COMMISSIONER GEESMAN: Thanks very much.

COMMISSIONER BOYD: Thank you, Tom. On your last point, money -- money is always the problem and we usually have the means at our disposal to extract money to do research on various occasions. It would be nice to have money on the front end of things and maybe there are opportunities here or not.

I'll just comment a little bit on desalination. In yesterday's hearing the subject of once-through cooling and water kind of skipped across the water a few times in the overall discussion of the day, and I happened to mention that I was at a conference last week in Long Beach that I, I saw from the agenda that you had spoken the previous day on the same subject.

And I found it a very interesting panel that I appeared on. It was desalination and energy, and it had the President of Edison and a couple of other folks on it, and there was an environmental panel immediately thereafter that did nothing but talk about once-through cooling at

power plants and no discussion about desal.

But in any event I found it intriguing that the desal industry was awfully optimistic about their future and their projections of where they're going, but a lot of it was predicated on the assumption that energy costs which are, they're not very water intensive, as you just said they're more energy intensive, but there was a lot of feeling that a co-locating could yield wholesale prices of electricity or a deep discounts, or a lot of other flexibility that I believe our panel poured a lot of, pardon the pun, cold water on.

But it is an interesting topic that's going to be debated a lot more, and apparently in front of your Commission, because I learned that there are a couple of existing power plants that people have proposals that I guess you'll deal with, to piggyback on the intake structure.

So, it's going to be an interesting debate in California's future, but I don't think it's as optimistic as some people think. And it appears to me that all the data is that brackish water conversion is far more economically viable and technically viable than seawater conversion,

but that's to be seen.

One last comment. I was thinking of it during Mr. Ellison's presentation, but what Commissioner Geesman said just a few minutes ago of, you know, what Commissioner's responsibilities are.

We get up here and we put on quasi judicial robes and we have to predicate our decisions on the record that's developed, as good or as bad as it may be on each individual case, so it is kind of a case by case approach that we take on things.

And I do kind of agree with Mr. Ellison that you find yourself really in an almost case by case basis. I'll predicate some of that on the tour of duty I did do at the Department of Fish and Game or the several years that I spent as the Deputy Secretary of Resources for Environmental Programs, and the huge gamut of issues, including watershed restoration and what have you I dealt with.

And none of this is simple, and there's no simple answer for each one of the situations. And you do what you can do to improve the overall situation and do what you think is best for the

"environment."

But when you have to predicate it on the record that's been established it makes it kind of interesting. And I'd have to ask Chris, I don't know if my hair was this gray when I started the Morro Bay Plant process, but in any event it was very interesting.

MR. LUSTER: May I make one comment to follow up on that. You mentioned the importance of the electrical rates. One more player in all this is the PUC, they've been asked -- I don't remember the Assembly Bill --

COMMISSIONER BOYD: Yes.

MR. LUSTER: -- they're looking into the issue of should desalination facilities get a lower rate. They've just started the work on that and are supposed to report back to the Legislature very soon.

COMMISSIONER BOYD: And in order to look at the nexus between water rates and energy rates and, it will be interesting.

MR. SMITH: Tom, I want to ask a question about the 316B working group that you said the LA Water Board has been convening. In response to Commissioner Geesman's question you

indicated that -- I just want to make sure I understand your response -- you indicated that the venue represented by the NPDES permit renewals, those proceedings, are an effective forum to address the issues of cooling or once-through cooling because of the working group that the board has now formed in order to address the new 316B regulations?

MR. LUSTER: In part. I would say the NPDES forum is valuable, but it's not the only mechanism. I think the whole idea of cooperation and coordination among the agencies allows the NPDES process to do its work.

When a project's in front of your Commission or the Coastal Commission we each have our own processes, but if the agencies can agree perhaps on what a valid study is, how often those studies have to be updated, what are feasible mitigation measures or alternatives, if there are some guidelines that are shared among the various agencies, so that we know when an NPDES permit is coming up for renewal, or a siting case is coming before you, every one pretty much knows what to expect as far as the review process and what kind of science will be brought in and what measures

may be set aside because we found that they are infeasible.

This has to be weighed with the case by case review, but I think there are some common areas of understanding we could develop through this cooperative process.

COMMISSIONER GEESMAN: I agree with that, but it strikes me that, over a five year cycle, if we actually do focus on the NPDES process, we'll cover 100 percent of the plants. if we focus on those that come in front of your Commission, or those that come in front of this Commission, we may get a handful over a five year period of time, perhaps not that many.

MR. LUSTER: Well, my concern is that even though we'd have the new 316B rule, we haven't implemented it yet. And so if a power plant takes the option of not doing a study and the regional board allows that option to go forward, when a desalination opponent comes in front of the Coastal Commission we're going to want a study.

And so, if it doesn't happen through the NPDES process it may happen through the Coastal Commission or through your process.

COMMISSIONER GEESMAN: Then I'd suggest that perhaps the Governor's Ocean Council would like to prevent just that factual scenario from unfolding, and perhaps that's where our collective agencies might better focus our immediate attention, in trying to build up an adequate database of plant-specific impacts, and utilize that NPDES permit process in order to accomplish that.

COMMISSIONER BOYD: I guess, critical in that scenario is the five year schedule, which, my experience is, including other state agencies I've worked in that have had five year mandates, most are totally unable to even come close to reviewing things on a five year schedule.

So I'm sure the water boards, have been scrambling, the regional boards have been scrambling and will continue to scramble, and the need to address that dilemma. I think the track record's pretty poor in terms of the currency of some of that.

MR. GREGORIO: Good morning, Commissioners, my name is Dominic Gregorio, and I'm a Senior Environmental Scientist with the ocean end of the State Water Control Board. Thank

you for the opportunity to explain the State and Regional Water Board's efforts to address the impacts of once-through cooling on water quality and marine life.

We are very concerned with these impacts. Please let me summarize again the relevant state and federal law. The California Water Code, that is the Porter-Cologne Act, requires that new or expanded power plants shall minimize the intake and mortality of all forms of marine life.

As your staff stated, the State and Regional Water Boards do administer the Clean Water Act in California. Specifically, I wanted to mention two parts of the Clean Water Act, section 316A and 316B.

Section 316A requires that the states regulate the thermal discharges from power plants, and 316B of course requires that the cooling water intake structure reflect the best technology available for minimizing adverse environmental impact.

The State Water Board has a statewide policy, dating from 1975, that promotes the use of once-through cooling in ocean and bay water in

stead of in inland water bodies, as a means of conserving fresh water.

We also have statewide plans and policies that relate to water quality. For example, we have the California Ocean Plan and the California Ocean Plan is the water quality control plan for all of the ocean waters of the state.

And that plan is what's used to regulate the chemical constituents in the discharge from power plants. If there is a discharge into an enclosed bay or estuary we have the California Toxic Rules, the state implementation policy for that rule, that then regulates the chemical constituents.

With regard to the thermal impacts, the State Water Board has the statewide thermal plan, which addresses the impact of heated discharges from power plants, as required under section 316A of the Clean Water Act.

However, the thermal plan does not include requirements for intake structures, and there is currently a void of any statewide plan or policy to address the entrainment and impingement impacts.

Your staff clearly and correctly

described the Phase two rules. I was going to discuss those, but it's already been talked about this morning. So I'll jump right into our NPDES permit process.

The Regional Water Boards issue National Pollutant Discharge Elimination System permits, or NPDES permits, that regulate the impacts of thermal discharges, chemical constituents, entrainment and impingement from power plants.

So when the Regional Boards develop those permits they have to consider all of the statewide quality control plants, as well as their local basin plants.

I should mention also that that document serves two purposes, the NPDES permit is also under state law a waste discharge requirement. So one of the comments earlier, I believe by Caryn, was that it is a state permit -- it's a state permit in that it is a waste discharge requirement under the California Water Code, but it is also a federal permit under the Clean Water Act.

The NPDES permits are reconsidered and renewed every five years, that's true. And oftentimes we actually miss the five years, we don't make the five years I should say, and that's

usually a result of inadequate personnel resources, that's usually the cause of that.

But we still believe that this is an important venue, it's an important opportunity to reconsider and further regulate the impacts, especially from the existing power plants. So we agree with you on that.

It was asked that we comment on some of the staff discussion earlier, and there was one slight inaccuracy with regard to the NPDES permits. the NPDES permits are for point sources only, they do not regulate non-point source impacts.

One thing that could cause that confusion is that storm water is considered a point source and not non-point source, and so that might be what the cause of that confusion was.

Honestly, up until now each regional board has been independently struggling with entrainment and impingement issues in the NPDES process.

And from our perspective the 316B regulations are difficult to implement because it's difficult to estimate baseline conditions, or sometimes even when you estimate those to agree on

the same time.

So, with tithe, I'd like to welcome any questions that you might have.

COMMISSIONER GEESMAN: What's the anticipated followup to the Laguna Beach workshop. Is that headed to a rulemaking process, or --?

MR. GREGORIO: Yeah, that's what we believe at the staff level. The board has directed us to put this workshop together. There will be two board members there, much like this workshop is structured.

After the public comment is considered from that workshop we'll get direction from the board, and it's very possible that that direction could be to create a draft statewide policy on this issue.

COMMISSIONER GEESMAN: And what would the timeframe be for receipt of any direction from your board?

MR. GREGORIO: Well, I can't really estimate that on my own, but usually it's fairly quick.

COMMISSIONER GEESMAN: Okay.

MR. GREGORIO: Yeah, I don't think it would take a long time. It might be right after

the meeting, it could be up to a month after that, you know, I can't give you an exact --.

COMMISSIONER GEESMAN: Okay. Thanks very much, and thanks for being here.

MR. FORD: Good afternoon. I want to thank the Commissioners and the fellow members of the panel for coming down today and sharing their perspectives on this issue.

My name is Tom Ford, I'm a marine ecologist with the Santa Monica Baykeeper. I'm a member of the SMBRC technical advisory committee, and I sit on the harbor safety committee for the LA-Long Beach harbors as an alternate, and I certainly as well as members of my organization have been involved with the 316B working group that's been going on down in Los Angeles.

I would say in general I've been encouraged at hearing some of the qualified support for the findings regarding the US Commission on Ocean Policy, and certainly the reactions of the state of California and the formation of the California Ocean Protection Council and California Ocean Plan.

And admittedly the compounding effects, and we could certainly spend hours on this as

Chris pointed out, are discreet. They certainly are affecting our coastal waters, and in Los Angeles and in Santa Monica Bay.

We feel that we've been doing a great deal of work. Many of the organizations represented here today have been doing a great deal of work to the tune of hundreds of millions of dollars to turn around Santa Monica Bay at this point.

And I think, from my perspective, it's time for the cooling water intake structures and the once-through cooling going on at Santa Monica Bay to step up and meet that challenge as well.

These efforts certainly are not recent. They go back certainly well into the 70's. There's an entire decade spent restoring kelp forest off of Palos Verdes and that appears to have been successful.

And I bring that up specifically to get back to some of the restoration mitigation that I see often addressed as one way to offset the impacts.

And again, in a more specific manner, there's elements in the staff report that we found truly compelling, and that it that we are not

dealing with water. Certainly it's water from an engineering perspective that is enabling us to cool these plants, but it is what is contained in that water that is being impacted directly.

And that affects all of us, directly or indirectly, depending on how we use our coastal resources.

And certainly that 7 of 21 power plants having recent studies is something that, I'm encouraged here today. I see impetus to address this issue site by site, go after these other plants, figure out what's going on so that we can get to the bottom of what's going on at each one of these independent intakes.

And again from my perspective, I saw numbers put up by Mike Foster and also by Robert Unsworth. I think Mike's numbers sound a little more in line with my perspective, and with my experience as a restoration ecologist.

And in general the Santa Monica Baykeeper certainly supports the six findings defined on page 22 of the staff report, and we look forward to working towards alternatives to the current once-through cooling systems that are happening in Santa Monica Bay, for it's habitats

and for the resources that they contain.

And with that, I'd be happy to take any questions that you may have.

COMMISSIONER GEESMAN: Thanks very much.

MR. DILLON: Good afternoon, Commissioners, my name is Joe Dillon. I'm with the national Marine Fisheries Service, Southwest Region. I'm the Regional Water Quality Program Coordinator.

I've prepared some notes, I call them our agency thoughts and perspectives on once-through cooling. You've heard some of this already from some of your staff and from other panel members, but I'm going to go ahead and repeat it so you know that we feel the same way.

First off, once-through cooling is an older technology that may not be replaced by environmentally superior options.

Number two, the Southwest Region of the National Marine Fisheries Service would like to see all power plants that utilize once-through cooling technologies modernized to other cooling technologies, and thus avoid impacts in its trust resources.

Number three, we recognize that it is

not feasible in the short term for many power stations, and may not be economically viable in the long term for others.

Number four. All power plants that utilize once-through cooling should conduct full Clean Water Act Section 316B studies to determine impacts from their facilities. The burden is on the permittee to show that they are not having a unique impact.

They should also fully explore the potential to upgrade the cooling systems with "alternative cooling systems." Ideally these analyses will be conducted with independent expert oversight, not only to avoid the appearance of bias in the analysis, but also to compensate for the lack of resource agency personnel and expertise.

We have been drawn in to power plants more and more over the last few years, but we don't have a power plant engineer on staff.

Number five, at a minimum the facility should be required to initiate measures to minimize impacts, such as modern screening systems, use variable speed pumps, etc., coupled with mitigation projects to offset unavoidable

impacts.

Monitoring of the effectiveness of the mitigation, and potential further mitigation requirements based upon this monitoring should be expected. I think that speaks for itself.

Number six, the facilities and companies which choose to invest in protecting California's marine and estuarian habitats by installing "alternative cooling systems," in addition to not needing to repeat Clean Water Act Section 316B analyses and facility engineering analyses periodically, should be rewarded as much as possible by Cal ISO, PUC, and yourselves, with long-term contracts.

And I'm not sure exactly how your authorities blend together. I know there's been some debate over the years and all that kind of stuff.

Number seven, those that do not invest should be continued to be fired as if they were peaker plants, as is indicated in your aging power plant studies, until more environmentally friendly facilities make them expendable. They will be expected to minimize and mitigate for the impacts in the meantime.

Number eight. The emphasis involved in this process is mainly through two laws, the Endangered Species Act and the Magnuson-Stevens Fishery Conservation and Management Act, commonly referred to as essential habitat.

ESA concerns are mainly related to the lists that are more prevalent in northern California. EFH applies across the whole coastline of California and into the freshwater systems, as far as EFH listed species are present.

So for some on it it goes up to the base of the dam.s Technically it could go to their historic range, but we're not there at this point in time.

Number nine. EFH is a habitat driven statute. And this is required to provide conservation recommendations when a federal or state project may have an adverse impact on EFH.

And adverse impact is defined as "any impact which reduces quality and/or quantity of EFH and may include direct, indirect, site-specific or habitat wide impacts, including individual, cumulative or synergistic consequences of actions."

Direct impacts are things such as

contamination or physical disruption, and indirect impacts examples are loss of prey or reduction in a species' fecundity.

Number ten, please note that EFH does not count fish, like the ESA. Population level affects are not a threshold for adverse impact.

And number 11, we also recognize the difficulties and expenses associated with the power industry at this time, exclusive of what's going on with section 316B and once-through cooling.

We have become increasingly involved with power plant projects the last few years. this involvement will increase with the new 316B Phase two regulations, and as we have learned about the impacts of these facilities.

As such, we wish to work with our agency partners and industry to expedite these processes and conduct our work in an open and cooperative manner. Combining projects through one process, in my opinion most likely to be the NPDES permit renewal process, would be helpful.

And I'll take any questions you have.

COMMISSIONER GEESMAN: Thanks very much.

COMMISSIONER BOYD: Maybe a few quick

comments. One, you earlier mentioned you didn't have a power plant engineer on staff, but later on you mentioned the value of working with other agencies. I think that is the value, and I think everybody recognizes that when you work together.

Different agencies have different skills, you combine it together you can get the task done, maybe even find some synergism. So that's happening more and more, and I encourage that.

The other point about either the Cal ISO or ourself or the PUC trying to incentivise this process by awarding contracts. Were we but king of the energy arena that would be fine, but none of us does let contracts, and maybe the PUC procurement process someday could address that kind of an issue. But, anyway, it will be awhile.

MR. DILLON: Since I'm starting to settle down here a little bit, I should take the opportunity to go ahead and praise your staff for the cooperation and the ability to work together that we have developed over the last few years.

It really was your staff in the Potrero Unit 7 project that got ahold of us to get our opinion on the process before it got too far

along, and we've been working relatively well together ever since.

And I hope that can continue.

COMMISSIONER GEESMAN: Okay. I've got one blue card. Why don't I call on him, and see where we go from there.

Tim Hemig, West Coast Power?

MR. HEMIG: Good afternoon. As you said, my name is Tim Hemig with West Coast Power, and I am representing the owners of the El Segundo Generating Station, the Encina Power Station, and then the formally Long Beach Generating Station, which was shut down at the end of last year.

And those are, of course, three of the once-through cooling systems that we're describing and discussing in this report.

And my view on the once-through cooling report is that it's a very ambitious effort to summarize the history of and the regulatory structure of these once-through cooling systems.

And I think the staff did a very good job of doing that and meeting most of their goals in the report.

I think there are three primary areas where I think the report could be improved, and

I'd like to describe those briefly.

The report leaves us thinking that there are uncertain but potentially very large impacts that are not being studied at all the facilities, and that we are actually doing nothing about them.

And I just want to make sure and point out that this is simply not the case. And I will discuss that in a little bit more detail shortly.

Secondly, the report uses information at some facilities to draw conclusions about impacts at all of the facilities. And it does this while saying that, at the same time, that impingement and entrainment affects are actually very much site-specific and not, I believe you can't make general assumptions and general conclusions about all of the data from a few of them.

One example of that is the Songs (sp) example that was put in the presentation earlier, about the level of impingement, and described as being 90 percent of the overall impingement in the suite of facilities that were described.

Obviously then the impingement at the other facilities must be very low.

Third, I think the report urges for --

COMMISSIONER GEESMAN: So what's your

concern then with the accuracy of that statement?

MR. HEMIG: I think just generally the point that, using information from some facilities, several facilities, and then trying to draw conclusions about other facilities with that information.

COMMISSIONER GEESMAN: So you think that it would be wrong to infer from the statement about Songs that impingement at other facilities is relatively low?

MR. HEMIG: No, actually I'm saying the opposite. I don't remember exactly which slide it was, but there was a description of the impact of the impinged organisms was basically about 8 to 30 percent of the fisheries take --

COMMISSIONER GEESMAN: The commercial sports fishermen.

MR. HEMIG: -- but then 90 percent of it comes from Songs. But, at the same time, it was at least my impression that the description was that the impingement effects were very significant at all these facilities, but the data being, you know, basically, the basis for this conclusion, was from Songs.

So I think you need to summarize it a

little bit better as just that, the report should be trying to draw information from the site-specific studies and information to make conclusions about those sites, not information from one or two to draw conclusions at all of the facilities.

COMMISSIONER GEESMAN: Well, and I do think there also appears to be a consensus in the room, you may not be a part of it, that we need a lot more in the way of site-specific studies.

MR. HEMIG: Actually, I totally agree with that. And I'm getting there, believe it or not.

And the third point I'd like to make about where I think the report could be improved is in its urging for policy decisions now, while at the same time saying that this issue is understudied and not well understood.

And I think that's really the root of most of the discussions today, and the general theme of this whole workshop, is that more current information is needed to truly understand this issue.

So I say, if that's the case, then probably a more appropriate time to consider

policy options is after that information is collected.

And I think the good news, that I'd like to report anyways for our facilities, is that we are in the process of collecting that new information.

It's actually well under way, and what I mean by that is that in some cases that data is collected already, like at the Encina Power Station, they just concluded the sampling part of its 316B study last month, and the El Segundo Generating Station is about to commence its sampling, its sampling final will be submitted next month.

So, that's the good news. But not only are we also endeavoring in these earnest efforts to study impingement and entrainment, we're also working towards a compliance goal in Phase two 316B, which as described several times today, requires impingement reduction of 80 to 90 percent, and entrainment reductions of 60 to 90 percent.

The report is, I believe, criticizing these facilities for not having these current studies. So I think it would probably be improved

significantly to have a section and better description about some of the ongoing efforts to initiate those studies, like I just described at el Segundo and Encina.

And I don't believe there's any power plant owner that I know of that's not working towards beginning studies in the near term.

The other noteworthy idea here is that these efforts are significantly expensive. We're spending millions of dollars on each facility to do these studies. There was one point brought up earlier that I'd like to highlight, which was about the idea of studying technology and maybe doing some demonstrations.

I totally support that. And I think the question that Commissioner Boyd brought up was, you know, the question of money. Well, the PIER group is actually currently funding some efforts along these lines through the, I think they call it the Wizer (sp) program at the Moss Landing Marine Laboratory.

And that information and that money is actually being spent on studies. To me, the money could be better spent on the technology question, because the power plants are spending money on

studies.

That's really the place that I think we can try to bring some more certainty and some more answers to is the question of technology. And we had very good descriptions today from Rick York about all the different options, and basically the conclusion about all of them was well, we're not sure if they'll work. So that would be a good place to put some efforts.

So basically, with such a major effort underway to better understand the site-specific issues and real deadlines of compliance and real requirements of reduction and impingement reduction required of each of these 21 facilities, and certainly I'm speaking for our three today.

I ask that the Commission defer its policy decisions on the matter until all of these efforts are completed. Thank you.

COMMISSIONER GEESMAN: You mentioned how much your spending on studies. Is it fair to say that the anticipated capital cost of the El Segundo Project or the Encina Project, if it is in fact re-powered, is somewhere in the order of \$250 to \$350 million dollars?

MR. HEMIG: I think I lost you on the

capital cost of the actual reductions of
entrainment --

COMMISSIONER GEESMAN: No, the facility
that you're going to build at El Segundo, or at
Encina if you choose to go ahead with that. \$250,
\$350 million?

MR. HEMIG: I think it's well above
either one of those. For the el Segundo two on
one combined cycle facility is, you know, quite a
bit more than the higher number you're talking
about, as far as I can tell.

COMMISSIONER GEESMAN: Okay. Well, in
2003, when our staff estimated the life cycle cost
of combined cycle power plants, they figured about
30 percent of the cost to the ultimate customer,
over the anticipated service life of the plant,
would be attributable to capital, and 70 percent
attributable to fuel.

Of course, when the did that calculation
they were projecting natural gas to stay in the \$3
to \$3.50 range, and we know it's been quite a bit
higher than that, so 70 percent is probably a low
number.

And I would suggest to you that,
certainly speaking for my colleagues and myself,

but I would guess for the various other regulatory agencies that companies like yours end up coming before seeking permits, that the question of what's a big cost and what's an expensive cost and what's an appropriate cost is really seen in that context.

If the number, which you suggest is larger than \$350 million in El Segundo, only represents 30 percent conservatively of the expected life cycle cost to the public, I suspect that most regulators will not be hesitant to impose reasonable mitigation measures on the project, that can be justified from that cost standpoint.

And I actually think Mr. Ellison hit a responsive chord when he said that many times the reasons these improvements are not pursued is not a question of cost, but more likely a question of feasibility.

MR. HEMIG: Absolutely. And I'd like to clarify that the point about the millions of dollars being spent is just in the studies. I'm not actually saying that it accounts for all the costs of 316B or all the costs of once-through cooling systems, and whether or not they should be

renewed in licensing.

Specifically, just pointing out that we are investing considerable money in the study of this issue and that we're not taking it lightly. I wanted to step back to that point that we're doing nothing about it.

We're basically three of the 21 facilities that are being described as not having current studies, and those are studies that are ongoing, in fact nearly complete at one of our facilities.

So I just wanted to make sure that its well understood that we're not taking this issue lightly, we're not sitting on our hands doing nothing, and I think we're actually ahead of schedule as far as what 316B allows in its overall time frame, not speaking at all about the cost of compliance of a debate about whether or not once-through cooling or alternative cooling. I'm not getting in to that issue at all.

I think, if there's one thing that I'd like to make as clear as possible, I think that the policy options that are laid before you, some of those I believe are untimely at this time.

We hear about State Water Board, about

taking action as a state, overall policies of discussion, I think that's the appropriate place to do it. And that is really where I'd like to try to limit my comments, is to that.

COMMISSIONER GEESMAN: Well thank you very much for the comments, Mr. Hemig.

MR. HEMIG: Thank you.

COMMISSIONER GEESMAN: Anyone else here to address us? I can't tell if he's going to the microphone or not.

Okay. We'll take a lunch break then, we'll reconvene at 1:30 for the Avian Impact theme of the day. Thank you very much for coming today.
(Off the record.)

MR. MCKINNEY: Good afternoon. My name is Jim McKinney. I'm Project Manager with the Energy Commission staff for the 2005 Electricity Environmental Performance Report.

This afternoon's workshop will cover a couple of issues relating to avian impacts issues and collision, both with wind turbines and electric power lines. We'll do the first part of that, interactions with wind turbines, the first part of the session, and power lines the second part of the session.

This is the fourth and final workshop on a couple of items that we've looked at indepth as part of the 2005 Electricity Environmental Performance Report.

A couple of housekeeping items. The agenda for this part of the program will be staff presentations from Melinda Dorin, staff biologist in our Environmental Office, and Linda Spiegel, staff biologist with the Public Interest Energy Research Group, also here as part of the Commission.

Following those staff presentations we'll have a multi-stakeholder panel presentation, and I'm very pleased with the panel members we have today. We have representatives from industry, Alameda County, and the conservation community. So we're very pleased to get a good cross-section there.

Following stakeholder panel presentations we'll open up for audience and stakeholder comments, and would note, Commissioner, that the speaker from the Department of Fish and Game has asked to go first in those audience comments.

For those of you joining us by phone,

welcome. Please use the mute feature on your phone, because we can hear everything very clearly that comes through your phones.

Just by way of introduction, for those of you that weren't here yesterday when we really kind of introduced and summarized our findings from the 2005 Electricity Environmental Performance Report, that report is a key support document to the report that our Commissioners will develop later this fall regarding energy policies that they will then forward to the Governor and Legislature for their consideration.

We have a large role in identifying and summarizing environmental issues associated with power generation and electric power line transmission.

The implementing statute for that is SB 1389, a bill from Senator Bowen. And a couple of things I just wanted to quote again here, one, it directs the Energy Commission to develop energy policies that conserve resources and protect the environment.

Another part of the Act requires the Energy Commission to prepare an Integrated Energy Policy Report, again addressing major energy

trends and issues, including but not limited to impacts on resources and the environment.

And as somebody who thinks very broadly about our energy infrastructure and its diversity and its size, I'm always somewhat saddened when we have conflicts such as this between wind power, which is really I think the energy power resource of choice in terms of its commercial viability, it's flexibility, and generally very, very low impacts on the natural environment.

There is however this vexing issue of avian mortality, and that's birds, raptors, hawks, bats, what have it. So we're here today to both kind of summarize the state of the science as we understand it now, as it's evolved from 2003, but really to move forward in a problem solving mode.

We've done a lot of work over the years through PIER and our office in identifying and flagging the issue, and I think it's really time now to move forward and go to a problem solving mode.

And that was the direction we got from our Commissioners during the scoping phase of this.

And I think that's all I need to say by

way of introduction. so with that I will turn it over to Ms. Dorin, and she'll walk you through the first part of the staff presentations.

MS. DORIN: Good afternoon and thanks for coming. As Jim mentioned, this is the first part, chapter one, and it's avian fatalities that are from interactions with wind turbines.

Background on wind development. California was one of the first states to begin developing its wind resources, and wind was developed prior to knowledge of avian impacts in the state.

Development of wind energy has also varied due to the federal and state tax credits, and that's one of the non-environmental reasons why wind was developed in the 80's and 90's, and then slowed down quite a bit in the late 90's.

In 1998 Alameda County implemented a moratorium on additional wind development at the existing cap until avian issues could be addressed.

History of Energy Commission research on avian mortalities. The Energy Commission actually sponsored one of the first studies, in 1989, that identified avian impacts as a problem.

They also studies bird use studies at Altamount Pass, Solano County, and Tehachapi Pass in the early 1990's and mid-1990's, and continued with funding research in Tehachapi in San Gorgonio.

And Richard Anderson published one of those reports on Tehachapi, the San Gorgonio report is in press.

And the latest four year study of the Altamount Pass was also funded by the California Energy Commission, through the PIER program. And two reports from that effort, Smallwood and Telander in 2004 and Smallwood and Nair in 2004, are available.

History of Energy Commission policy. The Energy Commission has supported wind development for many years, dating back to the 1980's. One of the reasons is wind projects do provide a clean energy source without using fossil fuels and without air quality impacts.

And wind is also an important resource that will help meet the RPS goals.

In 2001 and 2003 in the Environmental Performance Report, there was a section in the biology chapter about wind and avian impacts, and

in 2004 the Integrated Energy Report update identified avian mortality as the largest environmental barrier to wind development.

And the update also recommended implementation of the mitigation measures out of the Smallwood report, in 2004. That was the result of PIER research.

So, regulatory background. Most of the avian species killed by wind turbines are protected by the Migratory Bird Treaty Act. There are also additional acts, the Baldwin Golden Eagle Protection Act, the California Department of Fish and Game codes, that have no provision for take.

So not only is it the Migratory Bird Treaty Act but the other acts also.

There is also the Endangered Species Act, state and federal, and fortunately endangered species don't seem to be a problem thus far out at the wind areas. And there are provisions for taking in those acts.

COMMISSIONER GEESMAN: Melinda, let me ask you, on Migratory Bird Treaty Act, does that cover bats?

MS. DORIN: It does not.

COMMISSIONER GEESMAN: Ravens?

MS. DORIN: It does cover ravens.

COMMISSIONER GEESMAN: Redtail hawks?

MS. DORIN: It does cover redtail hawks.

COMMISSIONER GEESMAN: Kestrels?

MS. DORIN: Yup.

COMMISSIONER GEESMAN: Thanks.

MS. DORIN: I think the only exemptions are for starlings, there's one for house farrows, there's a couple of brought in species that are not covered by the Migratory Bird Act, pretty much everything else is.

COMMISSIONER GEESMAN: Okay.

MS. DORIN: Wind energy siting and survey guidance documents. Really recently, at the end of last year, the US Fish and Wildlife Service did issue interim guidelines, and they included survey requirements that were pre-construction and post-construction, site evaluation and avoidance measures.

They also suggested that wind development be completed, and the survey be completed, with the Fish and Wildlife Service and Fish and Game or with the resource agencies, that they be consulted during that process.

The National Wind Coordinating Committee

also has guidelines. One of those was done by the avian subcommittee in the late 1990's, in 1999, and they published guidance for survey methodology for determining and monitoring impacts.

The siting subcommittee also published a handbook, and that was the guidelines for permitting wind facilities, but it did include a environmental section of that handbook.

COMMISSIONER GEESMAN: And what are the effects of, well, let's start with the Fish and Wildlife Service guidelines, where do those apply?

MS. DORIN: The Fish and Wildlife Service guidelines right now are just recommended, and they're voluntary. And so to my knowledge they are not being, let's say taken front to back and implemented. So they're, there's actually a public comment period right now on those, and so they're receiving feedback on the guidelines, but to my knowledge they are not being implemented to a large degree.

COMMISSIONER GEESMAN: And after comments are received, presumably they'll be finalized, and will they have some more formal effect then?

MS. DORIN: They would if they are

finalized. I think it depends on the process. There has been feedback from landowners and other members, I think even the National Wind Coordinating Committee has given feedback.

And so I think it just depends on the next step that Fish and Wildlife Service takes.

COMMISSIONER GEESMAN: And who is the National Wind Coordinating Committee?

MS. DORIN: It's a subcommittee for AWEA, it's the American Wind Energy Association. And they have subcommittees that deal with, they've broken out into working groups, so they look into the different issues.

Siting background. So wind projects are permitted by local agency. They do complete the CEQA documentation. Different counties have varying survey and mitigation requirements.

And there is an opportunity in this process for them to consult with Fish and Game and the Fish and Wildlife Service, but since Fish and Game and Fish and Wildlife Service aren't issuing permits for endangered species on a lot of these projects there isn't very good jurisdiction for the Fish and Game and Fish and Wildlife Service to be involved, so --.

And each of these districts do complete their own CEQA documents. So for instance SMUD out in Solano County would complete their own CEQA documents.

COMMISSIONER GEESMAN: Who enforces the Migratory Bird Treaty Act?

MS. DORIN: It's the Fish and Wildlife Service.

COMMISSIONER GEESMAN: So they must have a fairly active and ongoing role then in these reviews, do they not?

MS. DORIN: They do, and they provide comment letters.

COMMISSIONER GEESMAN: Okay, but it's a comment letter that is the primary source of their input, or --?

MS. DORIN: Correct. And it would just be if the Fish and Wildlife Service wanted to take a followup action under the Migratory Bird Treaty Act. The fine for Migratory Bird Treaty Act violations are I believe maybe \$50,000 a bird, I'd have to check that, but it's pretty substantial. So they could choose to prosecute.

Trends in wind energy development. So, the trends right now are for re-powering the

existing sites with larger, more reliable turbines.

Expansion of wind facilities. And since a lot of the primary wind areas have been developed their expanding into secondary wind areas.

And for both of these they are using larger, more reliable turbines, where a lot of the older turbines were 250, 500 kilowatts, now we're at one megawatt or above. And some of the newer projects are using 1.5, 1.8.

They are occupying a different air space. They are larger, taller, and they do have a larger rotor swept area. And lights are also being required in some areas due to FAA regulations.

Also the Bureau of Land Management has recently developed a programmatic environmental impact statement for development of BLM lands on the western states. And actually last week that was just finalized, and it's available on their website.

And also one of the other trends is consolidation of owners, since the 1980's. So in 1985 there were 42 operators in the state that

owned 10,914 turbines. In 2003 there were 18 operators that owned 11,941.

COMMISSIONER GEESMAN: Now, is an operator the same as a developer, or is a site likely to be developed by somebody and then contracted with an operator?

MS. DORIN: I believe nowadays it's the same. I think, historically, it was different, but now they're the same.

COMMISSIONER GEESMAN: So the industry in California is concentrated on 18 operators now? Or in 2003 it was?

MS. DORIN: Correct. Why avian fatalities occur. Bird behavior differs by site and by species, and fatalities occur when turbine blades and birds occupy the same space and so birds do have to be flying in order to hit a turbine blade.

Perching rates and tower types have not been shown to affect mortality rates, although it was hypothesized in some early studies.

COMMISSIONER GEESMAN: I guess, I have to confess I have tried to track this issue over the years, and I'm having a hard time divorcing myself from what I thought to be the case

previously and, well, for example this last bullet, you identify what I previously believed to be the case was merely a hypothesis, that perching rates and tower types have no impact?

MS. DORIN: Correct. So, like in Tehachapi, in the study they found that some sections of the wind areas was using lattice type towers, some were using tubular. And they couldn't separate out those two effects from some of the other variables.

In other, more recent studies that Linda will be talking about, there is a little bit more clarity with that. But really, that was hypothesized early on because they saw birds, raptors, perching on either in operating towers or derelict towers, and they thought maybe that that was the limiting factor, and if there were more perching opportunity, but none of the studies have really shown that that's a factor.

COMMISSIONER GEESMAN: And that's true across sites?

MS. DORIN: Correct. Where it's been looked at. So Tehachapi, Altamont, Solano -- well, I'll go into the wind resource areas, but --.

And also bird risk varies by species location and terrain. So, in some instances you have certain species getting, having more impact in certain areas. And bird use may be higher, or -- you may see a lot more birds but, like in Tehachapi bird use was high, but raptors were getting hit at a higher rate.

So risk really differs, depending on the species and location.

Turbines can be sited in areas to minimize interactions between birds and turbines. So we're further along on that point with the Altamont Pass and surveys that have been done there, and then studies.

But there are areas where turbines are not having as great an impact.

Fatalities and emerging issues. So bat collisions and wind turbines were not identified as an issue in early reports, but surveys for bats were not conducted.

And long periods between the surveys may result in most bats being scavenged by predators. Large numbers of dead bats have been found in two wind areas on the east coast. And at the high winds project in Solano County surveys have been

detecting large numbers of bats, although definitely less than on the east coast.

COMMISSIONER GEESMAN: And what size turbines were those on the east coast where the bats were found?

MS. DORIN: They're the larger ones. And also the ones in Solano County are the larger ones. It's the relatively new projects. So that preliminary information from the high winds project in Solano County, and surveys there are occurring every two weeks, part of their post-construction surveys.

Some of the hypotheses as to why bats may be colliding include they're migrating to the area, they may be foraging and they may be turning off their echolocation. They may not be able to detect the turbine blades, or they may be foraging near the blades because of insects in the rotor swept area.

And the bat and wind energy cooperative was originally formed to develop a bat survey protocol and mitigation measures, and that effort recently has been constrained a little but they do have some documents out about protocol, and they're coming along with some of that.

COMMISSIONER GEESMAN: Have we found bats in Alameda County?

MS. DORIN: No, but once again the surveys there have only been once every 90 days, and really where they're finding them is where they're surveying very frequently.

And that's one of the things that the bat and wind energy cooperative found, that the longer they waited the higher rate of predation, so it was difficult to find them.

An introduction to the wind source areas. Avian fatalities continue to be an issue impacting birds when re-powering and wind expansion. In Solano County surveys have identified bird and bat deaths in high numbers, although not as high in Altamont so far.

Avian collisions have also resulted in a lawsuit in Alameda County by the Center For Biological Diversity.

And not only does the level of bird and bat research differ by wind resource area, bat and bird fatalities differ by wind resource area.

It can be difficult to compare research results, depending on the metric used. So one of the things with comparing the older reports is the

turbines were smaller, and if you're doing a sample of bird per turbine it can be very different depending on whether it's a new turbine or depending on what the megawatt capacity of the turbine is.

COMMISSIONER GEESMAN: Now why is that?

MS. DORIN: Well, for example, if you 100 one megawatt turbines, and you had 100 bird nests, you'd get one bird death per turbine or one per megawatt.

But if you had 200 turbines that were 100 megawatts, so they were only 500 apiece, you'd still get one bird death per megawatt, but you'd only get .5 per turbine, because you've got twice the turbine.

So in comparing studies, if the same metrics are used you get a better understanding of what the statewide trends may be.

COMMISSIONER GEESMAN: Okay.

MS. DORIN: California primary wind resource areas are Solano County, Altamont Pass, and Pacheco Pass, Tehachapi and San Gorgonio, and Solano County is also known as Montezuma Hills.

Wind resource areas in 2003. Altamont Pass still has the most turbines out of all the

wind resource areas. Tehachapi actually generated more kilowatt hours, they're using some of the larger turbines.

And then this is just a general raptor use per 10 minute scan, so when they did bird observation, bird use surveys, went out and did point counts for 10 minutes, and raptor use is a lot higher at Solano County than at other areas.

And this was actually done at Solano County before there was a lot of wind development there.

COMMISSIONER GEESMAN: And it looks like you have 13 years over the span of those different studies. Do you feel that a study conducted in the early 1990's is still a representative assessment of what's there now?

MS. DORIN: For the bird use, yes, because that's a pretty standard methodology.

Also, on this slide is a summary of some of the fatality rates out of the research. And for Solano County it was actually taken from the high winds data. It was in an EIR, so one thing to note is that on the hard copy I had transposed some numbers and I have fixed them for the presentation, but it didn't make it into the

copied number.

So all birds in Solano is actually .6, and raptors is .3. Another kind of interesting thing to look at on this slide is that Altamont -- so the unadjusted or unadjusted for search or bias, or for scavenger rate. So it's just the raw data that's been calculated out.

And in Altamont, if you look at the unadjusted versus the adjusted, when they did the search for bias and scavenger rate, the rates went up quite a bit.

COMMISSIONER GEESMAN: And what are those adjustments?

MS. DORIN: So, when they do the survey they look at scavenger rate, so a lot of the time they'll take chickens or other birds and they'll put them out and see how long they take to get predated.

And then they figure when they look and find dead birds that there's some portion of those that they're missing that have been predated, and calculate that back in.

The same thing for search or bias. When they find dead raptors they'll mark them and leave them out there. And then when people are doing

the transects (sp) if they miss some portion of the bird they'll calculate that back in also.

COMMISSIONER GEESMAN: And are those standard adjustments?

MS. DORIN: Depends on the wind resource area. So some of the studies have taken existing search or bias rates and scavenger rates from different areas that the study design was the same. Some of the studies have done them on the ground at the one resource area. So it depends on the study.

Altamont Pass. Once again, it was developed prior to knowledge of bird fatalities. It has been well studied over the last 20 years. There is an adequate understanding of bird use of the area.

Fatality rates still are higher here than elsewhere. And there's a comprehensive four year study that resulted in recommended mitigation measures. So the studies are moving from just assessing bird use and figuring out what the issue was to how can it be resolved, and Linda will be speaking more about that.

That study estimated 721 birds, including 881 to 1,300 raptors being killed

annually.

COMMISSIONER GEESMAN: Why the range?

MS. DORIN: Because it depends on the, once again, the bias and the scavenger, and then it depends on over the years of the studies. So there's confidence intervals and there's, just the scientific approach, you have to build in a range, a high and a low value.

COMMISSIONER GEESMAN: Is there some context for that number of fatalities in terms of other human caused fatalities to the same species in that area?

MS. DORIN: There are, and actually Mr. Ericson's here. There was a paper that they did and looked at different fatality rates from different human caused effects.

And one of the things I talk about in the paper is that, even though there are other human caused effects on birds it is really important cumulatively and legally to address this issue to bird populations.

So if there's mitigation that can be implemented, and it's successful, then there wouldn't be a reason to not explore that as an option. So, yes there have been some reviews

done.

COMMISSIONER GEESMAN: You indicated in the staff paper that bird deaths can impact the species. Has that been established in any of these study areas?

MS. DORIN: It has. There is actually one study that Linda will talk more about, it was a golden eagle study that Granger did out in the Altamont Pass, and I think over seven years they radio collared 257 eagles, and of those 100 of them died, and 54 of 100 died either from wind turbines or electrocution.

And so -- once again Linda will talk about it -- there going to do a followup study to see what the impacts are on that population. But there was a suggestion that for many golden eagles to die that that's a local impact on the species there.

COMMISSIONER GEESMAN: And is there a rule of thumb, I mean that's 54 percent attributable to wind turbines or to electrocution, is there some threshold that needs to be crossed before you're able to make that assessment?

MS. DORIN: We really depend on the species and the variables for the site. So -- and

that goes back to bird risk. So if you have lower bird use, and you're killing the same amount of percentage, if there was only three birds there and you killed two, that could have a very different impact than if you had 20 birds there and you killed ten.

So that needs to be explored more as to species site. If they're migrating, what is the potential long-term impact, is that a population wide impact or not. There hasn't been a lot of research on that.

COMMISSIONER GEESMAN: But your comment was that, from a legal standpoint and from a biological standpoint, that you believe we should pursue a strict liability policy where, if mitigation measures can be established to where it can be feasible, that we should be focused on any bird deaths. Did I correctly summarize?

MS. DORIN: Correct. So a lot of the research has been done on raptors, but if there's mitigation that can be employed, then I would suggest for any bird death. Lowering that rate would always be good.

Turbine owners in the Altamont Pass have agreed in concept to remove high risk turbines, or

do a partial seasonal shutdown. The specifics of that are still being worked on.

Renewal of the use permits have also been constrained by the lawsuit by the Center For Biological Diversity. The appellants are requiring mitigation to be implemented. And there was a working group that was established as part of that process, and recently, in the last few months, it was sort of disbanded and made smaller.

Originally the CEC and the agency were invited, but due to constraints they wanted to meet just the county and industry and then the Center is also there, so --.

In Contra Costa County there is a project, the Buena Vista project, that has committed to implement most of the mitigation and monitoring out of the PIER study, so they were using the PIER results to site turbines in low risk areas and also just as a note, the permitting process was completed timely in that case, and they are waiting for their turbines now.

There is also --

COMMISSIONER GEESMAN: What constitutes a low risk area?

MS. DORIN: Linda will be talking about

that. She's got some great slides of that, so I'll let her do that. I can fill you in if there's any other questions.

COMMISSIONER GEESMAN: I guess I'm interested because you disabused me about one notion about the lattice work and perching. I'm interested in where we're operating in the realm of hypothesis, and where we're operating in the realm of something more established than hypothesis.

I think you've also undermined my confidence. I had been told, I suspect on a hypothesis basis, that larger turbines were preferred because they operated at a elevation that was above the flight pattern of many of these birds, but your indication is that the high wind turbines in Solano have had what you characterize as a significant bird mortality problem.

There are probably several other of what I considered to be emerging scientific consensus that may in fact have only been hypothesis. So I'm trying to get a better feel for what's hypothesis and what's a little firmer than hypothesis.

MS. DORIN: Well, and that's correct out

at the Altamont Pass, so what Smallwood and Nair found, and like I said Linda's got some great pictures of that, was that the, it goes back to bird use and operating turbines.

So birds hug the ground more there, and so one of the hypotheses that they came up with was, or mitigation measures, is that repowering may be a way to increase the ground to turbine blade distance, and in that way lower bird collisions.

But in other wind resource areas that may not be the case, and that may not be the case with bats. Because going taller may be actually in their air space versus smaller turbines that weren't, so --. It depends on the wind resource area once again.

So resolving avian fatalities could lead to lifting the moratorium in settlement of a lawsuit which ultimately could lead to additional megawatts. And I just point that out as sort of a counterpoint to the first point, which is that even if there's a seasonal shutdown or there's removal of some turbines it could still lead to expansion, even though the short term would be loss of generation.

In Solano County, for some raptor species bird use is higher here than Altamont Pass. Golden eagle --

COMMISSIONER GEESMAN: Now, bird use, that sounds like a euphemism.

MS. DORIN: That's when they went back to do their surveys, prior to turbines, when they looked at bird use of the area which was sit for ten minutes and do point counts. They also did driving counts.

COMMISSIONER GEESMAN: Okay.

MS. DORIN: So it's abundance and diversity. High winds is required to monitor every two weeks as part of their post-construction monitoring, and they found 114 bats, 104 non-raptor avian, and 95 raptor deaths.

Survey results indicate a relatively high level of fatalities here compared to San Gorgonia and Tehachapi, it's lower than Altamont. And once again that's unadjusted and it's only one years' worth of surveys, so additional information would be really helpful on that.

And also just because of what happened with the other slide being transposed, these number got transposed too. So this is the

corrected version, for people that have hard copies.

The frequent search interval may also contribute to finding high numbers of dead bats, and we talk about that. And once again, because this is a site-specific post-construction survey, it would be difficult to extrapolate this out to the entire Solano County. It's better to just do a survey of the whole area.

COMMISSIONER GEESMAN: Yeah, I guess, could you elaborate a little bit more on the difference between site-specific values and what you might expect to find area-wide, either in Solano or Alameda County or any of the other areas you've looked at?

MS. DORIN: Well, once again it goes back to two variables, the turbines and the bird use. And so if high winds was, within Solano County, sited in an area where there were more birds, I don't know if that particular site is closer to trees maybe or a canyon or wherever those were sited.

If that was a high number then you wouldn't want to say the whole wind resource area, if you extrapolate that out. And it depends on

turbine type too. So if you have older turbines than newer turbines you don't necessarily want to extrapolate out to different technologies either.

So area wide could show you if there's some portions within that area. And that was one of the things they found at Altamont. Certain variables within that area topographically change collision rates.

COMMISSIONER GEESMAN: You also mentioned vegetation?

MS. DORIN: It could be. It could be -- and one of the reasons why Orloff and Flannery said that Solano County may have higher bird uses is because it's dry farmed, and there is a lot of open space there, it's rolling hills, and just a different set of species using that area versus Altamont, so --.

Solano County wind resource area is an example of an area that has high bird use and high fatality rates. The recently permitted project Shiloh one is require to provide habitat compensation. That's the first project in Solano County.

And they're providing an acre per rotor swept area, so they're providing 120 acres of

habitat compensation. Buena Vista also committed to providing money into a long-term account annually in order to go to habitat enhancement or purchase.

COMMISSIONER GEESMAN: In the context of, let's say the Shiloh project, what does habitat compensation actually consist of, and how closely co-located is that habitat to the wind machines themselves?

MS. DORIN: That would be up to the county to decide. And actually Solano County is going through a habitat compensation plan, and so there's that process, but I think some of the areas that they identified as open space were near the turbines and so, it really depends on how they set up the mechanisms to accept the funds or whether it's going into land trust in kind, that sort of thing.

COMMISSIONER GEESMAN: Okay.

MS. DORIN: Shiloh is also implementing mitigation measures designed for the Altamont Pass, and that's one of the reasons why post-construction monitoring would be so important here, to see if what's been proposed at the Altamont can also be used at Solano County or for

this particular wind development.

Pacheco Pass. There's one owner at Pacheco Pass and the wind turbines are actually located in the state park. It was private property when it was developed. No studies have been conducted here and there are no current plans to repower the site.

San Geronio. There was one study of bird use and risk conducted in the mid-1990's, and that's the report that will probably be out this year.

Draft data did show a low incidence of raptor collision, and Anderson also recommended followup studies to more accurately determine annual birth fatality rates. Some of the earlier studies were focused on bird use and not the rates and resolving the problem. So, that would be a next step.

In Tehachapi early studies found low bird use and low fatality rates. Raptors appear to be more susceptible to collision than other birds in this location, and redtail hawks, great horned owls and American kestrels have the highest collision rate.

Once again, here tower type is not

likely related to collision risk, and that was also supported in the Altamont Pass by Smallwood and Thelander, 2004.

COMMISSIONER GEESMAN: Now, what size turbine were they seeing at the Tehachapi resource area?

MS. DORIN: When this study was done they were the smaller turbines. I think the largest might have been 750.

COMMISSIONER GEESMAN: Okay. So no conclusions derived about the impact of any from the larger, more modern machines?

MS. DORIN: Right. So, if the site was going to be repowered or expand, then, right.

Out of state, the first offshore development is being proposed in Nantucket Sound, Massachusetts. And that's going through the permitting process. It's been a very lengthy permitting process, from what I read about it.

18 other states have developed RPS goals. Washington state is one of the first states that has developed wind siting and mitigation guidelines in an attempt to standardize pre-construction permitting and post-construction requirements.

They are voluntary and it is, permitting is still completed by the local agency.

COMMISSIONER GEESMAN: And how do those guidelines compare with either the Fish and Wildlife Service guidelines or the recommendations of the, I think you said wind coordinating council?

MS. DORIN: The Washington state guidelines don't require as much pre-construction survey and they really focused on habitat compensation component of it, promoting wind development in already disturbed areas versus taking other land out of other green sites, things like that.

COMMISSIONER GEESMAN: So that could be motivated by a variety of things other than the avian factors?

MS. DORIN: Correct. They wanted to require -- once again, it's voluntary -- but they recommended pre-construction surveys, and they recommend implementing mitigation to decrease the avian impact but they also have a large component of a habitat compensation, and that's not based on avian impacts.

And next up I'm going to introduce Linda

Spiegel, who's in the PIER environmental area group.

MS. SPIEGEL: Good afternoon everybody. As Melinda said, I'm with Public Interest Energy Research, part of this Energy Commission. I'm in the environmental area program.

Today I'm talking to you about our avian research program, and this part will focus on wind turbine issues.

PIER has many goals and objectives that we have to meet before conducting research. We have to justify our research. And the avian wind program in fact addresses a lot of the PIER goals and objectives such as working on solutions to providing clean energy, resolving environmental impacts, improving the environment, and providing greater choices for California.

There is actually four main areas of the PIER environmental area, just to give you some background, as shown here. I'm involved in the land use and habitat, which is in red and bold because in my mind it's the most important part of the environmental area.

Often when we're starting a research project we have to identify the problem statement.

And in this case, as everybody knows, California is dependent on reliable, stable energy supply, and requires a good mix of generation as well as transmission.

But we have a big problem with avian collision and electrocution on these systems, and those are in violation, as we mentioned, of law, so they've become a huge issue of siting and permitting of existing as well as any new development.

And also as Melinda mentioned, CEC's been involved in this issue for several years. In my mind we've been a leader in looking into this issue and trying to figure out what to do.

Early work was done to try to identify the problem and get a better handle on the extent of the problem, and ten years later we're still killing a lot of birds, so we decided it's time to look at this issue in depth and try to come up with how to resolve this problem, which is what we set out to do.

And again there are some drivers here. There's a moratorium that is on Altamont until the bird issue is resolved. It's not resolved and we have a renewable portfolio standard to meet, and

wind is important, and Altamont's important for that.

So Altamont is different. It's a high bird use area as well as one of the highest wind use areas in the nation. A lot of studies in other parts of the nations are showing that bird deaths aren't really happening, but if you look at some of those wind farms we're only talking 100 or so turbines, or maybe more, but nothing to the extent of 5,000 or so turbines at Altamont.

We also have a variety of turbine types at Altamont, there are I think ten or more types that I can think of.

And as Melinda said, there is a complex terrain, so you have a lot of micro habitat that is affecting how the birds use the area.

You also have high bird use. In Tehachapi and San Geronio for example we don't have these numbers of birds using the area. We do have just as much risk if a bird enters that area, it's just that fewer birds are entering.

But Altamont is close to the largest known gold eagle nesting site. It's also one of the largest use areas of migratory birds in the state, which is raptors, raptor population. And

then it's got a year around burrowing owl and also migratory birds coming in that is considered one of the, it's thought that it might be one of the highest density burrowing owl populations in the state.

In August we released our report. To my knowledge this is the most comprehensive study ever done on a single wind farm, looking at this bird issue.

It started from NREL, the National Renewable Energy Lab, funded the first two years of the study, and we took on the second two years. And again, the purpose of this report was looking at how can we start resolving the issue.

Our objectives were to look at what are the associations that are causing, potentially causing these fatalities to occur. We already knew they occurred, but we had to get at how to stop it.

So we looked at a lot of casual association of turbine types, the way the turbines are put on the landscape, the range management practices, and we looked at bird behavior. Then we used this information to develop a model that could help us determine, and to predict risk in

various situations.

We also used all that data to develop mitigation measures. And again, ultimately it's our intent to resolve this issue and support more development.

Again this is based on four years and lots and lots of data. We had almost 50,000 bird sitings on our behavioral studies, and nearly 30,000 of those were raptors.

We had 4,000 or so fatality searches over two periods.

I believe either Melinda has or will be recommending that there's three years needed post-construction to determine what your levels of fatality at a wind farm are.

This graphic shows that in the first year, year one through two, you're severely underestimating the level of mortality. It just takes time to get the information that you need.

And after three years, finally the data starts levelling off and you can believe that you have some reliable results. And in fact early studies that were done out there in a years' time or so had much fewer estimates of bird kills out there than we got. And what that has to do with,

it just wasn't enough time.

And to answer one of your questions, Commissioner Geesman, there is some talk about well, if wind turbines are such a big deal, cats kill birds and birds fly into buildings, but that's mostly -- you don't see a cat taking a golden eagle, and generally it's the reverse.

You don't see hawks and stuff flying into windows very much, they're pretty keen. It'll happen, but it's not that frequent. So this in my mind is the single greatest source of mortality for these raptor species in a localized area.

There's only one example I know that are different and that's Swainston Hawks in Argentina. They roost in large numbers in the winter, and sort of haphazard pesticide use kills several of them at once.

But other than that I'm not aware of any regional event that has this level of mortality.

COMMISSIONER GEESMAN: I thought you once before had told me that the automobile --

MS. SPIEGEL: The automobile does kill -
- yes, moving targets. Moving targets like wind turbines and vehicles can kill birds, particularly

barn owls, they seem to be really susceptible because they're night hunters.

You also see some byudios (sp) out there. So moving targets, they don't key in on that as well.

COMMISSIONER GEESMAN: But you think the impact is greater even than might be attributed to pesticides?

MS. SPIEGEL: Locally. I don't know if they're killing this many in a years' time, it hasn't been studies. But this is a large number.

COMMISSIONER GEESMAN: And explain to me the rationale for why it takes three years. I mean, your trends all seem to be upward, or higher volume. Is it because of the randomness of --?

MS. SPIEGEL: Somewhat. Yeah, it is, that's probably the best explanation. There's a lot of turbines out there. What kills a bird this year may not have killed a bird the year before. But eventually, if the turbine is in a high risk location within the Altamont, eventually it's probably going to kill a bird over time, and it just takes time to get a handle on just how much is occurring out there.

So one year alone is just a snapshot,

it's not enough time really.

COMMISSIONER GEESMAN: I guess I can accept it's not enough time. I guess what I'm not as clear on is why the slope is upward, why you don't perhaps experience a higher level of mortalities in year one than you do in years two or three? If one of the major influences is randomness.

MS. SPIEGEL: Because again it's often just a matter of time before some of these turbines are going to kill a bird. So if you go out there over a short period of time you're just not going to get the full effect.

COMMISSIONER GEESMAN: Okay.

COMMISSIONER BOYD: Granted you, we've done more work than anywhere else. What about elsewhere in the world, with countries like Germany rushing to put in wind farms and what have you, have they done any work, is there any data from other parts of the world that even comes close to what's been accumulated here?

MS. SPIEGEL: Not to my knowledge. Melinda, you may know better than I. But not to my knowledge. There has been some studies, particularly over some of the water based,

turbines located over water. But I don't think there's been anything to this level, that I've ever seen.

COMMISSIONER BOYD: Thank you. I had a terrible experience in Mexico last year at a conference, not on this subject, but that I spoke at.

But a gentleman made a presentation about the wind farm developed in the Wahaca (sp) area of Mexico, and I just got up out of the audience and asked him a question about any experience with avian fatality.

And he said that was all environmental myth, there was no such thing, and based on studies in Spain they had proven that the environmental community was spreading dead birds around at the base of the wind machines, just because they were opposed to them.

And then I identified who I was and where I was from and said I would send him a lot of data about avian mortality.

MS. SPIEGEL: I've got a huge report. Again, you know, we've learned a lot, as Melinda said, since the Altamont was built. And there's some guidelines out there to avoid this from

happening in the future if they're followed.

COMMISSIONER GEESMAN: Help me understand these ranges, Linda. Look at the range for meadowlarks, for example. Why is that so large?

MS. SPIEGEL: I think it has to do somewhat with a standard air, but it has a lot to do with the biases that Melinda talked about.

COMMISSIONER GEESMAN: Okay.

MS. SPIEGEL: I'm just going to run through some of the highlights of the results here. This shows the fatalities by species by season. Now, this vertical line in the middle where it goes down to 1.0, that's what you'd expect to happen if this was happening from chance alone, just purely random event.

Anything above that line is happening more than you'd expect from chance; below the line it's happening less than what you'd expect by chance. So what we want to show here is that winter in particular seems to be a time of year that has an impact on a lot of different species. Summer has an impact on burrowing owls as well as golden eagles.

So when you're looking at seasonal

shutdown, or even if it's temporary or permanent, you may want to look at the seasonal differences when you determine when to shut your turbines down.

This again, this red line, that's what you'd expect to see by chance. This shows flight occurrences within certain distances of the wind turbine. And you can see that the top bar for each shows that the vast majority of flights are happening very near the turbines, within zero to 50 meters, in some cases ten times more than what you'd expect by chance alone.

In addition, if you look at the last bar for each species, they're flying away from turbines in much fewer percentages than in what you'd expect by chance alone. So something's going on here that the birds are flying near the turbines.

COMMISSIONER GEESMAN: Now, can you elaborate more on what that graph shows? What's the bottom axis?

MS. SPIEGEL: That's how you determine if its a random event, it's a chi square analysis where you look at what you'd expect to happen according to how many bird observations you had.

And if it was a random event you run a statistical test and it tells you if you had this many birds and this many observations you'd assume this many is going to happen by chance, it just is. I mean, it's just a random event.

And if it's greater than what you'd expect by chance, and in this case as you can see we have 8, 9, and sometimes 10 times greater, then there's some kind of causal factor you can suppose is occurring here.

COMMISSIONER GEESMAN: And as a consequence your observer established for burrowing owls, ten minutes of observed flight within 50 meters?

MS. SPIEGEL: No, what we found is that, of all of our -- I showed you before that, in several thousand, tens of thousands of observations on the species, and we took that, and again, the chi square test is the observed divided by expected is how you get to that number.

COMMISSIONER GEESMAN: So it's a little more than ten times greater than what you had expected?

MS. SPIEGEL: What you would expect from chance.

COMMISSIONER GEESMAN: Okay.

MS. SPIEGEL: So they're flying around the turbines much more than you'd expect, and they're flying away from the turbines much less than we would expect, if it was just a random event.

COMMISSIONER GEESMAN: Okay.

MS. SPIEGEL: And as you were asking earlier, what we did find was that, with our flight behavior that a lot of our flight heights were occurring, 73 percent were occurring within the blade reaches of the turbines that are out there right now, these small turbines.

So that's why we're saying if we can get these blades up off the ground a bit more it's likely, if you use some of the larger turbines available, that we can maybe reduce that down to 16 percent of the total number of flight highs.

Now, this is given the conditions today. If we put up large turbines it might affect their flights. But what we're finding in Altamont is they hug the ground. It's called entrained foraging. They hug the ground.

And we feel that, because of that behavior at the Altamont, that getting these

turbines up higher can actually avoid a lot of collisions.

Again, as Melinda is trying to hit home, it's site specific. And that's why collecting bird behavior at the pre-construction surveys in any place is key in helping determine where you should place those turbines on the landscape.

COMMISSIONER GEESMAN: Well, it's site specific, but I believe that graph is for the entire Altamont area?

MS. SPIEGEL: Yes. So site specific meaning Altamont is rolling hills, the birds kind of use the area somewhat similar. They tend, we found for example, there's some micro siting we can do too, because some of our birds, the eagles, they like to fly in the deepest canyons. So they're getting hit there as well.

COMMISSIONER GEESMAN: But if I am reading that right, you could reduce 84 percent of your problematic flight pattern with the use of the larger turbine, isn't that a pretty large level of mitigation? Could you associate a similar amount of mitigation with any other single measure?

MS. SPIEGEL: Seasonal shutdown, that

would probably do a lot.

COMMISSIONER GEESMAN: Seasonal shutdown. And I think you've got a graph in here on that later on?

MS. SPIEGEL: Ah, yes.

COMMISSIONER GEESMAN: Okay, I'll wait until we get there.

COMMISSIONER BOYD: Could I ask a question about any correlation with land development patterns; that is, the encroachment of housing and etc., getting closer and closer to wind farm areas.

One, is that even happening, and two, is there any possibility that that changes the behavior of some of the species?

MS. SPIEGEL: Yes it is happening, just like everywhere else, --

COMMISSIONER BOYD: Yeah, but it's not happening in California?

MS. SPIEGEL: One thing about the Altamont, it is habitat for birds that you can't get in the neighboring areas because of the urban development. It's not really as conducive for them.

But I don't think that it's creating any

change in the bird behavior in the Altamont. We haven't really looked at any kind of before and after, but I don't see how it would, other than it might be concentrating birds.

The Altamont Pass, the size of it that's undeveloped or developed for wind, I don't think it's changed much.

This is just to show you that for each species we've tried to take the variables we've studied, these are just some of them, and try to understand what magnitude of increase on mortality each variable has.

So that if you're an operator and you have a problem with, say, golden eagles, you're killing a lot of golden eagles, or burrowing owl, you can go to these graphics and figure out what are some of the factors that we found that seem to be having stronger association than others and maybe do some micro site work on your area.

And in this case, again, is getting the blades higher off the ground. You can see, wind turbine congestion is 21 percent, because what we're finding is isolated turbines that seem to be more of a problem than when you cluster turbines and wind walls and that, and so forth. And so, we

have something like this for all the chief species.

COMMISSIONER GEESMAN: But aren't those interactive to some extent?

MS. SPIEGEL: Yes they can be, and that's very difficult to tease out. No question. If you have a turbine in a canyon that's on a steep slope or whatever, you know, you're going to start running in to what's -- you might, you could say -- we tried to tease them out whenever we could though.

Of course we tried to take turbines that were just in canyons to look at that effect, but it's really difficult.

COMMISSIONER GEESMAN: Once you change the turbine's size, though, aren't you --?

MS. SPIEGEL: This could go away. A lot of this has to do with being able to mitigate existing turbines, the existing situation. Repowering is another kind of manner, although some things could still apply. Like, we found that the amount of vertical edge, near turbine from disturbance and roads and things --

COMMISSIONER GEESMAN: What's vertical edge?

MS. SPIEGEL: That would be the area that would be adjacent to the road, the vertical area that's all kind of disturbed soil. so that the rodents can get into there, it's real friable, and the rodents can get there.

We found that has been having an effect on a lot of the species. So when you put in the new turbines you try to reduce that as well.

So here again are some of our significant findings. They're flying closer to the turbines that you'd expect, and they're not flying as far away from the turbines as much as you'd expect, so there's some land management opportunity possibly here.

Winter has a high fatality for a lot of species, summer for some others. There's some spots in the Altamont that appear to be causing more mortality. They're higher risk. You asked me before, what is a high risk location. We can look that up for each bird but some of it seems to be across the board.

And then, again, a lot of flights are occurring in the blade zone that's existing on these smaller turbines that are out there right now.

COMMISSIONER GEESMAN: What land management practices did you have in mind?

MS. SPIEGEL: There's a few things that we can do. I'm working with a landowner right now to come up with a potential grazing management study using sheep. With sheep you can herd them around a lot better because you can use electric fences and that, and you can really regulate where they're going or not.

So maybe we can get the grass a little higher around the turbines, because in our grasslands here in California, annual grasslands, when you get, when they get too thick and dense the rodents can't negotiate very well through it and the birds can't see them.

So we thought we could try to do that kind of thing, somehow reduce the attractiveness to the prey. So --.

And on that note, our studies suggest that rodent control is not really helping out there. Rodent control is used to kill the ground squirrels that golden eagles are preying on. And in fact it's very effective at getting rid of the ground squirrels.

But what we found is that it seems to be

changing the dynamics out there, attracting other species to coming in and fill that void -- pocket gophers and lagamores (sp). So that's attracting other species to come in.

So with the other negative, potential negative effects of the poisoning, and it doesn't seem to be helping in the long run, we suggest not doing it. But that is being debated. Some people aren't in agreement with us, including some people in the environmental community, and particularly the stakeholder right here is not happy with that.

So these are all recommended mitigation measures. There's more, but here's some of them. Repower. Place them on the leeward side of the slopes. I'm going to show you in a minute why I'm recommending that.

Relocate or seasonally shut down the highly dangerous turbines. Put them in these low risk locations outside of canyons or what have you. And again, that might depend upon what species you need to be targeting a reduction for.

Cluster them together. Don't have gaps, don't have isolated turbines. We have to monitor these measures because we don't know.

There's going to always be some level of

kill no matter what we do, whenever you have birds and turbines in the same air space. So we recommend offsite compensation to help recruit new individuals back, which would be nesting grounds for example.

And we recommend land management to help get these birds from flying so close to the turbines.

COMMISSIONER GEESMAN: Now how many of those items would you put in the category of hypothesized effective mitigation versus what I guess the lawyers would call clear and convincing mitigation?

MS. SPIEGEL: Well, in my mind these are clear and convincing to me. It's based on a very long study.

COMMISSIONER GEESMAN: In a way in which the prior thoughts about lattice towers was not?

MS. SPIEGEL: Yeah, well, we found that the birds aren't really perching on operating turbines, they're perching on non-operating turbines.

I have the graphics, but I don't have it with me on this one, that shows it's a pretty large difference. And earlier it was hypothesized

and it made a lot of sense, you know? But it turns out, when it was looked at in depth, it just isn't panning out.

In the couple of studies here in California where it was looked at in depth it didn't pan out.

You know, every ecological study is going to have its uncertainty, --

COMMISSIONER GEESMAN: Sure.

MS. SPIEGEL: -- but there's no study that has the level of analysis long-term that we have done. So it's the best going, as far as I'm concerned.

COMMISSIONER GEESMAN: How do we trade off between species?

MS. SPIEGEL: What do you mean?

COMMISSIONER GEESMAN: In the same way that we tune our air quality equipment or standards to target a particular pollutant above others, it would seem to me that some of these mitigation measures would be tuned to protect particular species above others.

For example, the tall towers, if the Solano high winds experience is any indication, it might be a good idea with respect to raptors, but

a bad idea with respect to bats. How do we --

MS. SPIEGEL: Yeah, well, it's killing raptors in Solano as well. I think the thing there is, the birds in Solano are using the habitat differently. Maybe it's because there's a marsh nearby and they're on their way somewhere, whereas in Altamont they're actually foraging there.

I don't really know. Again, it's really site specific, but -- for some reason, the tall towers are killing raptors in Solano. From what information we have on bird behavior it appears that getting them off the ground will avoid flight.

It could be, though, that the flights change when we change the -- I don't think so, because they're foraging more close to the ground. So, as far as, if you want to single out, say you want to really work on golden eagle, and that's your species, so that list of variables we came up with, that will help.

But also it's a summer/spring event, more so. Because you're dealing with nesting. Well, actually the nesting birds aren't getting hit, but adults that are around in the nesting

season, they just don't have a territory.

So, as Linda mentioned, we started a working group with the idea of having everybody working together and use our data and banter back and forth on how it could best be used, and it was made up of this group.

But it wasn't working, I guess, so the county decided that they just wanted to have the meetings with the appellants and the operators and so we're waiting to find out how that's going, and we've been using our data to run scenarios, as requested, to look at how the measures proposed would work.

We're trying to figure out how many turbines -- if you want to shut down turbines, we're trying to tell you these are the ones you should shut down, that are the most dangerous. That'll result in this, what we consider to be an estimated loss in megawatts.

And we also show what we believe, and again it's an estimate at the level of reduction that you can achieve in fatality by species.

This is an example of that kind of information. It doesn't show what you'd expect to get reduced by species, but these are three

different analyses that we've done at the request of the industry.

At A, we looked at, just biological factors. We came up with tiers, tier one is the most dangerous turbines. In group B we looked at megawatt size. And then in group C what we did was combine those two efforts to make it a little more equitable and have a little more biology base to it.

And we can show the number of turbines in each tier, and the number of megawatts we think that would be lost, and then again in the report itself it shows an estimate of fatality reduction by species, sort of a best bang for your buck.

And then this graphic shows the locations, the hot colors are in the high tier.

And then, this is really interesting, we looked at bird behavior. And these red dots are bird observations. And you can see ,they're all clustered in certain areas. There's some at the very top here and others down here.

This is the windward side. And we show that even when the wind changes the bird usually changes to the other side. So we're saying, try to figure out if you can get these new turbines,

put them on the leeward side.

I've been taking a lot of time, so I'm just going to kind of end it. We're trying to work with the operators to come up with a scientifically robust design. If they do look at seasonal shutdown so that we can monitor it in an effective manner.

We're looking with another landowner to look at land management practices. We also, we're looking at, we have a study where, for future development of secondary wind resources areas we're developing a model where they can predict whether they're going to have high levels of risk.

This is our golden eagle study. Basically it shows that the population was semi stable, but it's precarious. It could go up or down at any time. so we're following up right now, we're looking at the population again to see if in fact it's still doing okay.

Bats are becoming a challenge. We're sponsoring research to look at sensor technology, so people don't have to be out in the field looking at to see if these birds are hitting wind turbines, looking at contact and non-contact. It's a feasibility study at this point.

And then is my little mascot for my program, because land use habitat, and you know, to me research is power, and if you get enough information you can often find the solutions to what appear to be insurmountable problems.

MS. DORIN: So, just in summary. Staff findings, we found that most species killed by interactions with wind turbines are protected by state and federal laws.

As wind energy expands the rotor swept area increases and potentially more birds will be at risk for collision.

Additional wind development to meet the RPS goals is feasible, while at the same time eliminating avian impacts, especially at the Altamont, based on the PIER research that was done.

And lower risks to birds, developers should conduct protocol level bird use surveys prior to development. And that's one of those things that goes back to, if you identify where the high risk areas are you can avoid them. Using the survey results, turbines can be located to avoid high risk areas.

Statewide impacts on bats still needs to

be determined, and mitigation developed to reduce collisions. The bat working group has definitely started that effort on the east coast. It will be interesting to see if California is having the same issues.

The existing siting and survey guidelines are voluntary and the level of implementation varies by region.

The statewide guidelines could remove a significant barrier to increasing wind development in the state and gain consistency statewide when developing and mitigating projects.

The Altamont Pass has been well-studied over the last 20 years, bird use and mortality documented. And at the San Geronio Pass, Tehachapi Pass and Pacheco Pass they have been studies less.

Studies do report lower fatality rates, and once that's confirmed, that needs to be confirmed with the larger turbines, because there's other cases, then it may be appropriate to encourage repowering and expansion there.

So as the next step mitigation should be implemented and monitored at Altamont to determine their effectiveness, and Linda talked about that.

Two measures, seasonal shutdown and removal of high risk turbines, would reduce bird kills. It would also result in a loss of generation. And that also goes back to, if the turbine blades aren't moving then you're not going to have the collision risk.

Ultimately, implementing mitigation could allow industry to expand.

Past research has shown that bird use is higher in Solano County than in Altamont Pass for several raptor species. And recent post-construction surveys for high winds indicate high bird and bat mortality there.

Research aimed at identifying the extent of the problem and developing mitigation measures would allow for the continued use of wind resources in Solano county while minimizing the potential for another wind resource area in California with high impacts.

And the policy options. So the Energy Commission could promote development of new wind resources only in areas that have low risk to birds, and that could be regionally or site specific, using the mitigation and the research results.

To determine statewide impacts on bats the Energy Commission could support bat use behavior and carcass surveys at all of the wind farms in California. And that may be appropriate at different wind farms.

And the Energy Commission could also support statewide guidelines for requiring the wind industry to mitigate impacts on birds in the state.

And that could also be a two part guidelines, if there is guidelines for updating the original national wind coordinating committee guidelines. And so, requiring certain surveys and pre-construction, as well as development guidelines.

In the Altamont Pass wind resource area the Energy Commission could encourage industry to apply mitigation measures for existing projects, new projects and repowering projects to reduce bird deaths. And the same for Solano County.

And the Energy Commission could also support further research using more current research protocols in Tehachapi Pass, San Geronio, and Pacheco to confirm low avian and bat impacts in these areas.

And that goes back to one of the early studies in Tehachapi, where mostly bird use and not looking at fatality rates or mitigation, how do we resolve it. And that's the end.

COMMISSIONER GEESMAN: Thanks, Melinda.

MS. DORIN: Your welcome.

MR. MCKINNEY: At this point in the process we're going to switch over to our panel stakeholder presentations. I don't think we have a direct order, I'd just say, this gentleman to my left might be the way to start.

MR. WIEBE: Good afternoon, my name is Richard Wiebe, and I represent the Center for Biological Diversity. And I would like to thank the Commission for its interest in this topic, and for inviting me here to speak today. I appreciate the opportunity.

I'd also like to thank the Commission and its staff for its long-term role in promoting alternative energy in California, and I want to thank them also for promoting research into the environmental and social impacts of alternative energy sources, and for promoting mitigation of those impacts.

I think the Commission has for many

years taken a leading and admirable role in those tasks.

As you may know, we have been very involved in Altamont for the past several years, seeking to reduce the bird mortality from the existing facilities out there. I view the work at Altamont as primarily trying to solve the problems of the past.

And while Altamont does hold some lessons for the future, it's really the future that I want to focus on this afternoon, because I think that's really the focus of the Commission's emphasis in this proceeding.

And I think we're all directed toward the goal of trying to avoid any Altamonts in the future, any new areas with significant avian mortality.

And there are three policy recommendations that I'd like to present to the Commission this afternoon.

The first one is in the area of research. Again, as the staff presentations have shown, the Commission has taken a leading role for many years, not just in California but really worldwide in researching and quantifying the avian

impacts from wind energy development.

And we strongly advocate that the Commission continue this role. I think it's beneficial to everyone, that its done so in the past and will continue to do so in the future.

In particular, I think there's still great research that can be done in the area of siting. That was a topic that came up in the staff presentations, both in what's called macro siting and micro siting.

Macro siting being what areas do you generally choose in a large geographic region to place a wind energy facility, and then the micro siting being once you've chosen the location for a facility how do you locate the turbines within that particular landscape to produce the avian impacts as much as possible.

Again, as the staff presentations have shown, we've learned a lot of great information out at Altamont about micro siting issues. Linda mentioned the leeward side placement of turbines, for example, avoiding terrain features such as valleys and dips.

I would encourage the Commission to extend that sort of research to other types of

terrain. The Altamont -- well, we know a lot about Altamont now. Wind turbines throughout California are located in a variety of landscapes, through a variety of terrains.

I think you heard in the staff presentations that the information we've learned at Altamont is not necessarily transferable to a location such as Solano, where you have different topography, it's much flatter, different land use patterns.

And I would encourage the Commission to look at any similar sources of micro siting research on the various types of terrain features in California where wind energy is being considered.

COMMISSIONER GEESMAN: Let me express one concern.

MR. WIEBE: Yes.

COMMISSIONER GEESMAN: And I guess I might attach a little more significance on the micro siting front to the high winds experience, because of the turbine size.

But in reading through the staff report and the predecessor report last summer, and in listening to the presentation, I come away with a

pretty strong impression that the single largest dynamic in comparison with the junk that's out there now would be the replacement of those smaller turbines with much larger turbines.

And that that may introduce its own sets of micro siting issues, but I -- I guess I certainly heard what Linda said as it related to the leeward side. And I'm willing to presume that may have an impact irrespective of turbine size, although again, if the larger turbine eliminates in the Altamont 87 percent of your problematic flights I think that's a pretty strong mitigation measure.

I'm hesitant to place perhaps as much value as you might on drawing conclusions from a bunch of existing Model T's out there on the hillside, when there's no way in the world anyone is going to build more machines like that.

In fact, I think our policy priority probably ought to be figuring out a way in which to replace those older machines as promptly and as effectively as possible.

MR. WIEBE: And I do intend to address that last point as well.

COMMISSIONER GEESMAN: Okay.

MR. WIEBE: And I think, perhaps I'm not being as clear as I should be, but I think I'm generally in agreement with what you're saying; that is, my interest in micro siting research is not how to better micro site 100 kilowatt turbines, but how to better micro site a one megawatt or a three megawatt turbine.

COMMISSIONER GEESMAN: Okay.

MR. WIEBE: And let me be very clear about that, that is the focus. I think there are suggestions at least that some of these principles will translate across turbine size, and that the leeward instance, for example.

The idea is that the birds are congregating on the windward side, so if you're on the leeward side, whether you've got a 100 kilowatt or a one megawatt turbine, you're still out of the high bird use area.

But that would be my recommendation, that the focus of this micro siting research for example be directed towards the facilities that are coming down the road in the future as opposed to trying to affect existing facilities which, as you say, will never be built again in that fashion.

The second point that I'd like to encourage the Commission to stay involved in is promoting policies that encourage or require adequate pre-construction surveys of a site by developers.

I think there's pretty general agreement that the best way, one of the best ways to avoid the problem is by studying bird use before you've built anything, so you can identify any problem areas, either on a macro level or on a micro level. And you're not building yourself a problem that you're going to have to come back and fix.

COMMISSIONER GEESMAN: And how do you feel about the NWCC guidelines for surveys? Are those adequate?

MR. WIEBE: I think that -- the recommendations that I've been familiar with have been ones recommending two to three years of pre-construction surveys.

Now, one of the great complicating factors in this is something the Commission has no control in, and that's the federal production tax credit, which as you're probably familiar with has recently been renewed in very short intervals.

So, developers understandably don't want

to invest in a three year survey if by the time they get the survey completed the tax credit has expired and they have no guarantee that it will be renewed at that point.

So unfortunately that's been a tremendously complicating factor in getting developers to do long-term surveys when they can't make long-term plans.

But again, to the extent the Commission does have the ability to do so, I think it's important to encourage and promote these sorts of surveys, and again on both a macro siting and a micro siting level.

COMMISSIONER GEESMAN: How effective are the surveys with respect to bats?

MR. WIEBE: I am not familiar with that, with the answer to that question.

COMMISSIONER GEESMAN: I'm hypothesizing that you've got a night flight issue with bats. Maybe that's wrong. But I would suspect --

MR. WIEBE: I think that's correct, yeah.

COMMISSIONER GEESMAN: And that may be difficult to survey.

MR. WIEBE: The other thing that I think

is important, especially when turbines are going in to a new geographic region, is post-construction surveys as well. And I think that both allows you to evaluate the particular project and what continuing impacts it's having, and also builds the general database.

You can compare what the results were from the pre-construction survey with your post-construction results and use that to refine the more general models of what the avian impacts are.

My last point, I think, is one the industry will agree with, at least I hope so, they don't always agree with everything I say.

But this has to do with energy pricing policy. My basic message is make sure they get enough money. And let me tell you why that's important.

These environmental impacts, like the raptor kills we've been talking about this afternoon, as I'm sure you're familiar with are what the economists call externalities. They're costs that are, social costs that are being imposed that aren't being borne by those who create the cost.

And there are costs that all of us bear

in the general society for having fewer of these magnificent birds. A lot of what we've been trying to do is to get the industry to internalize the costs of these externalities.

And in order for the industry to be able to pay for the costs of the studies and the mitigation and whatever continuing environmental harm is caused by wind turbines they need adequate electricity pricing from the electricity that's generated by wind turbines to pay for those costs.

And I think this Commission and the PUC need to work together to ensure that the industry does receive adequate prices for wind-generated electricity.

This is important for new projects, since there are some locations -- high winds as an example -- where even though it's new technology and the pre-construction surveys are done, there are still going to be continuing raptor kills and the kills of other birds.

And the need to fund offsite mitigation, for example, to compensate for those. It's also important for repowering the projects, such as Altamont, which Commissioner, you raised a minute ago, as I think most people here know repowering

is the replacement of existing turbines with new turbines, generally much larger.

And everyone's hope is, particularly at Altamont, that this will have a dramatic and substantial reduction in avian mortality.

Repowering has been stalled at Altamont for a number of reasons. One reason is because part of the federal tax credit, which I mentioned, previously requires that when the owner of an existing facility repowers that they renegotiate their power purchase agreement with the utility, and this gives the utility leverage to seek a lower price on the new electricity that's going to be generated.

And I think that's one of the principle reasons, before that provision was added in 1998, in 1998 there were plans to repower about a quarter of Altamont, which never happened. By the time they were ready to do that this provision had been added to the tax credit and made it much less favorable to repower.

COMMISSIONER GEESMAN: That provision, brought about at the behest of the California utilities, as led by Southern California Edison --

MR. WIEBE: That's my understanding.

COMMISSIONER GEESMAN: -- is known in Washington as the California fix. And I would speculate that had not the California fix been put into the law, very much of the Altamont would have been repowered by now.

And I do think that if we're looking for villains here, or those to whom accountability should be attached for raptor kills in the Altamont, the California utility bear a fair amount of that burden.

MR. WIEBE: And that's one reason why I think it's appropriate, to the extent that this Commission and the PUC can, to bear down on the utilities, and particularly in the case of Altamont make sure that repowering is, that there are adequate financial incentives for repowering out there.

Now, in the PUC's renewable portfolio standards proceedings, which are ongoing right now, we have advocated that the PUC ensure that, particularly at Altamont, that the wind companies receive adequate prices to encourage repowering and to pay for mitigation.

And again, we advocate that this Commission take whatever steps it can towards that

goal as well.

COMMISSIONER GEESMAN: I agree with you, I think that's a good point. In the PUC's June 2003 decision on RPS they implored the utilities to get moving on repowering. From my perspective there's not been much movement thus far, and I think that we can converse with our colleagues at the PUC to try and see if we can't get more activity on that front.

MR. WIEBE: I appreciate that. A couple of points in comment to some of the questions you had, Commissioner, in the course of the presentations. As far as I'm aware, the only cumulative effects study comparing wind turbine impacts to other impacts have looked at bird species in general as opposed to on a species by species basis.

And I think Mr. Ericson was the author of that principle study. And obviously species are stressed by many different sources, and I think that's why it's important to look at things on a species by species basis.

The, you'd asked about the offsite mitigation at the Shiloh wind project. It's my recollection, which I stand ready to be corrected

on, we had commented on that EIR and had some conversations with the developer.

I think they were talking about doing about 120 acres, and they'd come up with a formula which we didn't agree with which was based on the rotor swept area of the turbines, and taking that area and essentially laying it down on the ground as the mitigation area. Which, to us, just didn't have much biological basis.

COMMISSIONER GEESMAN: And, do you know if that's simply gone into their land bank or habitat bank in Solano County, or is there a specific location --

MR. WIEBE: There was a particular person that, they were looking at it at one point, there's sort of a transitional marsh area, there's kind of a slough that runs to the west of the Shiloh project across the road from it.

And it was my understanding they'd been looking at a parcel in that area, but I also know they were talking to the Solano land trust in terms of managing it, and I don't know where things currently ended up on that.

The only final thing I would have to add, again one of your questions on why the range

and variation on some of these mortality estimates, and again as a non-scientist I stand ready to be corrected, but this was something that interested me too and the answer I finally found, and with your permission I'll hand this up to you in a minute, was Table 311 from the August 2004 study.

And it has two columns of mortality estimates for each species. One of them is an adjustment for search detection but not for scavenging. The other is an adjustment for search detection and scavenging.

So, for example, if golden eagle, the low estimate of 75 a year is based on search detection only adjustment, the high estimate of 116 is adjusting for search detection and scavenging.

And that's why the smaller the bird the wider the variation, because smaller birds are more easily scavenged by predators, and so it's harder to get a fix on how many you're missing from scavenging on that.

And I'll hand this up for your --, and again, thank you very much, I appreciate the opportunity greatly to address you.

COMMISSIONER GEESMAN: Thank you, Mr. Wiebe, we've followed your work with considerable interest, and admire your effectiveness.

MR. MCKINNEY: And I'd like to next introduce Mr. Darryl Gray from Alameda County. Mr. Gray, did you have a presentation for up here, or do you just want to speak from there?

MR. GRAY: Actually, no. I'm just going to speak, these are essentially, they intend to be my discussion notes here. I wasn't really sure about the format style and program elements that were going to be covered, so I can just speak from my notes, if that's okay.

Good afternoon, Commissioners, I'm happy to be here. I'm Darryl Gray, Assistant Planning Director with Alameda County. I hope you don't mind me sitting down here, I'm not able to catch both ends of a doubleheader, playing senior baseball this weekend. So I appreciate the opportunity to sit down and rest.

(laughter)

I found staff's presentation to be tremendously informing and valuable. Just by way of background, the initial permitting process in Alameda County began in 1981 and sort of hits it's

heyday all the way through 1986.

And as part of the planning staff I've been probably there from day one, and was instrumental in working with CEC earlier on with Dick Anderson and Jeff Evans to sort of kick off this fact finding process in terms of establishing essentially what was the impact in terms of wind farm development and avian mortality out in the Altamont Pass area.

And in concert with my colleagues in Contra Costa County and Solano County we were able to begin the initial kickoff study back at that time.

We, in Alameda County and Contra Costa County have moved forward through many cycles in terms of wind farm development, beginning as you had indicated, Commissioner Gleason, with lattice towers.

And in listening to staff's presentation I must admit to having the same bias as well when I heard that information. I'm finding it hard to let that go at this point, especially when I read through the report.

It's simply because, not only from an intuitive basis but sort of listening to the

industry as they were collecting data, and some of it didn't necessarily seem to jive, but again this all seems to be a very serious fact finding process that we've gone miles and miles since the day when we first got started.

Just a few comments with regard to the presentation and status of permitting process in Alameda County. I've heard it mentioned on several points that Alameda County has adopted a moratorium, and in some ways that concept is correct.

What Alameda County has, and I believe Contra Costa County, is well in place as essentially a cap. That cap came out of discussion in our 1998 repowering EIR.

And in that program EIR you will find that, as we were able to get some of these, we were able to get some of these repowering projects on line, we were going to be doing ongoing monitoring and collecting that data.

And if in fact the information showed that there was going to be a significant change in mortality out in the Altamont, that cap may change. And so it was really intended to be a data point from which we can start to base

scientifically defensible information.

If you had a moving target it wasn't going to be as scientifically valid as it would be if you had a stationary target. And that was the real intent behind it.

And so, even though, again, I wouldn't necessarily argue or debate about the concept of moratorium, it essentially has the same effect along with the other externalities that took place in terms of energy pricing, etc., in terms of becoming an obstacle for repowering to move forward, particularly in the Altamont.

One of the other concepts that we had, I had heard was that the working group hasn't sort of been set aside. Actually the working group is in place. The group had decided that it had made a significant amount of progress as a total body.

The total body included participation with Fish and Wildlife Service, Fish and Game, as well as CEC staff, and really important the researchers and consultants that they brought on board as well, the industry, Sierra Club and other environmental groups, property owners, as well as the other permitting agencies, folks from Solano County, my colleagues, and Contra Costa, my

colleagues there.

And there were other interested parties that came from media groups that had been participating in the working group, and so that group is still in place. It doesn't have a formal standing to the extent that it was put in place by our Board of Zoning Adjustments, but when the appeals came those actions were held in abeyance.

But in terms of cooperative spirit to move forward the working group did constitute itself, and we did in fact begin meeting. To date we've had eight meetings of the larger group.

The group had decided that it could be more productive if it became a sub-group of industry and appellates, to sit back and work through some of the areas where there was less area of agreement at this point in time.

And so that group has met a couple of times, I believe, as well as the hearings that our Board of Zoning Adjustments had had. And the public hearings that our Board of Supervisors have had.

I believe that will continue to move forward in a successful fashion. I believe the sub-group will probably meet one or two more

times, and that could hopefully lead towards at least a gelling of consensus in those areas where there isn't consensus.

It'll be planning staff's role to present both points of view to our Board of Supervisors and our Board will be making those final decisions. We do have, just as a matter of technical cleanup, we do have a couple of applications that are still pending before our Board of Zoning Adjustments, but those will likely move forward in the same process and be susceptible to the decisions that are made and collected by our Board of Supervisors.

I could probably go through those areas in which the group has developed some strong consensus. I think staff has done an admirable job in presenting those points of view in the presentation that you heard.

Some of those areas, where there's less agreement and they're still going to be discussed would be the level of kill bird reductions that are needed to be achieved. And that needs to be sort of couched within the economic environment that exists right now.

The timing and extent of those

mitigations, and even to the extent that they're talking about offsite mitigation, but I'll touch on that in just a second.

And then funding sources, and the framework for ongoing monitoring, and I want to touch on that too, because I believe the permitting agencies would have a recommendation to your Commission along those lines.

We've got some steps that are needing to move forward. We're going to need to intensify our efforts in the coming weeks to find at least some workable middle ground that is going to serve the interest of all the stakeholders.

Again, with the caveat that we know that there's going to be some areas of disagreement that are still left, and that will have to be policy decisions that are going to be made by our board.

And hopefully that would lead to the current litigation hopefully resolving itself but if it doesn't things will move into that arena.

We still have the goal of attempting to reduce mortality to the levels of least significant by still maintaining the fact that we need to have viable companies. Obviously one of

the scenarios could be, as I saw on the screen, if you significantly reduce the number of turbine sin the Altamont and significantly reduce the energy output that would have some direct effect in reducing mortality.

So it's that balance that we're looking to strike. And so we would hope that we would continue to have the involvement of the CEC, the CEC staff, as well as the involvement of the Fish and Wildlife Service, Fish and Game, as well as the other interested stakeholders in this group.

And to that extent one of the first recommendations I would perhaps suggest to your Commission is that you remain involved in this process. You are an active partner, and we have benefitted tremendously from the research efforts that your Commission has funded.

The permitting agencies have contributed in kind funding. It was required to do so. And so I think we all have tried to exercise a degree of responsibility in terms of making sure that we are adequately addressing this issue.

But the high degree of independence that the CEC staff brought to this process was really a tremendous aid to the permitting agencies.

And to that extent, I see in one of the recommendations that mitigation measures in the Altamont be applied Altamont wide. And there again is going to be another balancing act that I think permitting agencies are going to need to look at carefully.

Because, again, if you are looking to maintain economically viable assets in the Altamont for which the permit was granted you're not going to be able to divert a significant amount of resources per se to offsite mitigation.

And so, again, I think one of the major goals should be looking towards repowering.

I think one of the other assets that I think the CEC brings is this degree of independence where we're bringing working groups or different parties together, but I think one of the things that would perhaps produce more significant consensus behind the recommendations that come out is that while these policy positions and recommendations are being developed as a part of the future reports that are coming out of the CEC that there be a greater collaboration of all the stakeholders before those are finalized and then presented to the public or presented to your

Commission. That would be another tremendous help there.

And so with that, those are all of my comments.

COMMISSIONER GEESMAN: I wonder if I could ask you to elaborate a bit upon that last point. Collaboration among whom? We spent a lot of time in workshops with I think every element involved in the wind industry and the affected biological stakeholders. We're not commonly in much contact with landowners.

But is there a way in which you think that we could either expand our process or change it a bit that would be more helpful to you?

MR. GRAY: Well, let me go back and, again I have a little bit of a legacy here. I believe when Contra Costa and Solano first started developing their energy policies the planning staff's were speaking to one another.

That information sharing was expanded down into the Tehachapis, San Gorgonio, when that was happening.

I can then recall, as wind energy policies were being developed in Minnesota, Texas, Massachusetts, I had conversations with staff

planners there, again not necessarily mandating that they follow a lot of the guidelines, but just providing a lot of information as a springboard.

And again, the Altamont, I guess, maybe it was infamous at the time, but I did in fact have discussions with researchers and consultants in Holland, in England, in China, so though staff is correct that a lot of the information that is developed in the Altamont is really site specific and terrain specific, some of the general policy concepts are transferrable across geographic boundaries.

COMMISSIONER GEESMAN: Yeah, I would strongly agree.

MR. GRAY: And so to that extent, I think here today a lot of information was shared that I just became aware of today. And so I thought it might be advantageous to have had some input prior to the document being finalized.

And so to the extent that you might be able to encourage that kind of interaction, that's probably the extent.

COMMISSIONER GEESMAN: That's good, that's a good point. Is there anything else that you think we could do going forward that would be

of greater assistance to you.

And let me say, we pretty obviously have a policy interest in seeing more energy coming from wind generated electricity. As I indicated with Mr. Wiebe, we do have a very strong interest in seeing these existing sites repowered.

We don't have any particular attachment to the legacy equipment at all, and I think the studies that our staff has done have documented some of the adverse consequences of that legacy equipment.

We'd very much like to see you work through the problems that your county has, I think ably, come to grips with, as it relates to the Altamont. And we're hopeful that Contra Costa will follow in your footsteps and learn from the experience that you've had.

We'd like to see an expanding resource in that part of the state. What can we do that would be of use to you in the years ahead?

MR. GRAY: Well, I think as stewards of the public trust you've made a significant investment in the Altamont to date. As we move forward one of the things that will be a significant issue will be this degree of

independent monitoring that your staff has seemed to brought to the table.

And that will really be an asset as we look down the road toward the repowering and removing the older technology, replacing it with the new technology, being able to do post-construction monitoring as well as pre-construction to the extent possible.

And so that second recommendation that I noted to your Commission I think is really a heavy duty one. If you could stay involved there, continue to expand your investment in that area, I think that would be of tremendous help to the permitting agencies.

COMMISSIONER GEESMAN: Thank you very much.

MR. MCKINNEY: Next is Diane Fellman from FPL Energy.

MS. FELLMAN: Good afternoon Commissioners Geesman and Boyd. I am here today, I'm Diane Fellman, I'm Director of California Regulatory Affairs for FPL Energy, which is the largest owner of wind facilities in the state of California, today in the country, and depending on the day of the week, in the world. We have a race

going with Spain.

I'm also here speaking on behalf of PPM Energy, Altamont Winds, EnXCo, and GREP, which stands for Green Ridge -- excuse me. And our companies are all Altamont companies with the exception of PPM Energy.

But we're here today to express the views of a group of companies who probably own about 80 percent of the capacity in California.

Before I go in to my presentation I do want to say that I feel like I'm watching a version of the Japanese movie Rashomon, that we know there are facts out there, we know something happens, which is that birds collide with the turbines.

And we're hearing different points of view on how that is understood, communicated and treated. Today the wind companies -- and that's how I'll refer to us -- are not here to talk about the particulars of the Altamont or Shiloh or High Winds, although I have with me today and available to answer particular questions of either the committee or the staff, I have Wally Ericson from West, our scientific consultant. You've heard him referenced by the staff as one of the leading

experts on the analysis of avian impacts due to wind facility operations in the country.

And I also have with us Ms. Joanie Stewart, who is an employee of FPL Energy, but prior to that she worked for the premier developer of wind facilities in the state of California, US Windpower, which then became Kenetech.

And I may have been in the Altamont, as I've been saying today, about 20 weeks in terms of direct experience. But Joanie Stewart has been out there 20 years and she can talk about what's been done in the past and things that are going on now, or just general approaches to various studies.

With respect to what we are going to talk about today, we are going to give you a general presentation on process, and we are going to reserve any detailed comments on the staff report for our reply comments that are due July 15th.

And one of the reasons we are doing that is because we only received the staff report last Tuesday, and this illustrates some of the struggles we've been having with the staff work in the sense that often it's either released quite

late before a hearing or we don't even see it until the day of the hearing and we're put in a position of responding.

So we're going to take our time and look at it and give you detailed comments. I'll now move in to the presentation.

Everybody's talked about this today. We want to provide a maximum output of clean, renewable energy to meet the California RPS standards while minimizing avian mortality. We are very committed to this as an industry.

And I just summarized briefly what the Commission did in its 2004 IEPR update. And these findings I wanted to bring to the Committee's attention, but you've already mentioned your looking at encouraging renewable development, repowering, looking at incorporating the Energy Commission work into local agency activities.

This, I think, has been said by the staff, but I wanted to underscore two points on this slide. Actually, I'll just say all three points. We are displacing fossil fuel production and we provide fuel diversity and a clean source of power to the state of California.

We also acknowledge that there are avian

impacts and bad issues as a result of our operation, and we want to be part of the solution. We are not just sitting back saying nothing can be done, you know, it's take it or leave it, we've been very active, as I think you've heard from Mr. Darryl Gray, I think Mr. Wiebe mentioned, the staff mentioned it, we've been very active in trying to work toward a solution that accomplishes the balance of renewable production and environmental protection in the state of California.

And here is what we want to present to the Committee today, and we feel that we need to take a step back and we request that the Energy Commission take a step back as part of its 2005 IEPR and really look at how the studies that your staff are performing are being done, how information is being released, and provide a public stakeholder process.

And I just want to followup Darryl Gray's last comment, that we really would appreciate that and think that would be very important, because often at the local county level we're looking at conclusions rather than hypotheses. And I'll talk about that in a bit.

We believe that all avian risk reduction measures, and this would of course apply to bats as well, should have a sound scientific basis. We recommend that there be an adaptive management framework, and Mr. Ericson can talk about what that means. We have proposed that for Altamont and its used for wildlife management throughout the country.

We also request that there be due process. We have felt that there has not been due process, and despite the statements today that there has been an industry conversation with regard to the science, we feel otherwise.

And we are committed to achieving a significant and verifiable reduction in avian mortality over the current operations today in the Altamont, with the existing technology as well as siting and building new technology projects with either repowered sites or new sites that use the best available information.

I think we went over this already, but just to put in order of priority of how we deal with jurisdictional agencies, we find ourselves interacting mostly with the county, even though US Fish and Wildlife Service, as you've heard, has

the federal jurisdiction through its two statutes. And then occasionally California Department of Fish and Game weighs in.

Here is what we believe should be the steps to a scientific process for looking at regulatory actions. There should be a hypothesis, and then there should be an experimental design and protocol development, followed at that point by peer review with stakeholder input.

So, when you have an idea and you're figuring out how to study it, that should go out to both the scientific community as well as the stakeholders.

Then there should be research, there should be analyses with a draft report, followed by another round of very rigorous peer review and allowance for stakeholder input, and at that point there can be the publication of proposed conclusions and recommendations. As any report that the Commission issues is given.

And this is talking about how it should take place at the Energy Commission with respect to its studies. These steps can also be applied at the county level as well.

Then there would be this public hearing,

and what did not get on the slide is then your decision and authorization should take place. And that could be a decision of the Commission, or an authorization of the Executive Director that the Energy Commission's research has gone through this process and represents the best available science addressing the issue.

Because we feel now that there have been instances where the PIER analysis has taken place and has gone through some of this process. There have been attempts to discuss the contents of that, or the data, in one instance we have not been able to get the underlying data that was used in the PIER 2004 report, where we have some questions about it.

And some of the reports that have been referenced, that have been issued in 2005 by the staff, have been based on that. I think Ms. Spiegel did a bit of that in her presentation when she was up here.

And we have looked at some of that, and tried to look at some of the data, tried to understand it, but what has been characterized as CEC reports are really technical memos, as she said in response to industry requests.

But we haven't seen them, we haven't talked to them, and it's been very frankly frustrating in terms of our efforts before we invest the tens of millions of dollars necessary or forego the tens of millions of dollars of revenue to make these investments without having a chance to talk to the staff, or have a public process to vett some of the analyses.

So what are our recommendations? We support this process, and for the EPR, because this is why we're here today, we ask that the Commission adopt a policy supporting repowering and new technology, and those are distinguished between green field and brown field sites, to achieve California's RPS goals while minimizing avian impacts.

This is a goal that everyone shares. We ask for an open and transparent scientific review process before any further findings or conclusions or recommendations are made on existing analyses that will allow us to participate in the process as well as have other national scientists participate in the process.

And then, with respect to the local permitting agencies or with US Fish and Wildlife,

as Mr. Gray said, from Alameda County, they look at the Energy Commission as being truly independent.

Once there is an open and transparent process and results have been attained, that the results of that can then be made available to the proper jurisdictional entities, and that could include the CEQA process or if there's an EIS at the national level or part of the siting guidelines, wherever and whomever chose to look at that.

And then finally, and I think this has come out today, I don't think it's confusing any more, but there is a confusion in the general public sense that we need to distinguish mitigation measures for the existing fleet of turbines from the new and repowered turbines.

And that concludes my presentation. I just want to add that we do look at the Energy Commission as a source of very sophisticated and indepth research, but we do have this extreme frustration that we have not been able to participate in the research process prior to it being released and being deemed an Energy Commission product. Thank you.

COMMISSIONER GEESMAN: I guess I'm a little confused about what information you've tried to get and not yet been successful in obtaining?

MS. FELLMAN: If I may, I'd like Mr. Ericson to answer that question.

COMMISSIONER GEESMAN: Okay.

MS. FELLMAN: And I'll join him at the table.

MR. ERICSON: Wally Ericson with West, Incorporated, Cheyenne, Wyoming. I'm a statistician with West.

I think what Diane's referring to is we've asked for some basic data -- fatality locations, search dates of when particular turbines were searched -- and that information was provided for the last six months of the CEC study, which was the part that the CEC funded.

But the August 2004 report included data that was collected back since '98. So that's one part of the information we're looking to receive.

And a more recent request that we have been told we would get. But the timing issue is the most recent high risk turbine identification. But those are a couple of the basic data sets we

were looking for to be able to do some of our own analyses and haven't been able to receive.

Part of the issue is that its the initial data sets collected from '98 to 2002. There's some question of whether CEC can, has any authority to release that, since it was in the CEC report, all that information was in the CEC report, but part of it was funded by NREL.

We went to NREL to ask for it, they've told us to talk to the principle investigators involved, and they basically agreed that they didn't want to release it yet because the NREL report, which was before this, it was the initial three or four years of study, had not been released yet. So it's kind of a roundabout thing.

COMMISSIONER GEESMAN: Welcome to the government.

Uh, Linda or Melinda, other than the NREL thing, do we have any proprietary data or any confidential status data that --?

MS. SPIEGEL: No, we've given them all the data. The NREL data we didn't have any rights to, and when we requested it from Karen Sinclair, NREL's rep, they said respectfully no, not until we get our reports out.

But they have had all of our data.

MR. ERICSON: And Karen Sinclair of NREL did say that we could get the data, but we'd need to talk to the principle investigators, Shawn Smallwood and Carl Thelander, and they at this point have refused to release it, so --.

COMMISSIONER GEESMAN: As it relates to timeliness of receiving reports, nobody is going to get in front of Commissioner Boyd and I on that complaint line. We don't get this stuff in what we regard as a timely fashion.

So, I share your anger, and from time to time your disgust with the process that leaves all of us hanging to an inappropriately short time before public hearings and public workshops, in terms of seeing this stuff.

We have a new Executive Director, he'll start July 1st, and hopefully all of us will see fit to afford him a clean slate. But I think that's where the accountability needs to rest. And you're quite right in your demands that you receive that stuff in a timely fashion.

And if you're successful at it, please let Commissioner Boyd and I know and we may try to emulate your techniques.

MS. FELLMAN: Well, we'll make sure to forward any reports that we receive to you, so --.

I just wanted to add on that point, it's not just the timeliness of the reports, it's the conclusive nature of the reports when they are issued, that there is not a process prior to that release where there is, as Mr. Gray pointed out, a stakeholder or a peer, a formal peer review.

And when we read the staff report that is the subject of this workshop there are more conclusary statements in there, more indications for example -- one example is that high winds has high bat kills, but that was caveated today.

that's only one year of observation, where Ms. Spiegel said there should be three years of observation. High winds, it happens to be an FPL project, so we can speak to this. High winds has been permitted, it has a technical advisory committee, and the mechanism that we have been using, or attempting to use in the Alameda County process is the creation of a scientific review group, a panel of highly respected, not necessarily independent but highly respected scientists as well as government agencies that can vett the documents and vett the policies.

And right now the challenge we've been having in the Altamont and we see this in the report that's the subject of today's workshop becoming a statewide concerns is, again, conclusions are released based on Energy Commission staff studies, and there's no opportunity to refute those.

And also those become the statements of an independent agency, and Mr. Ericson has made many attempts to try to communicate with staff, to sit down, as you know, this science is inexact, it's not formed, and it's the equivalent of asking us to comply with an air regulation for example by a statement that this is, you know, how many parts per million have to be released, rather than understanding where that comes from what are the impacts, and --.

We want to participate in that, so when we make our investments to continue to deliver the wind energy to California, we make the investments to reduce the avian mortality, we are confident that we're doing the best thing that we can to do so.

And you yourself today expressed that possible confusion, Commissioner Geesman, and we

want to make sure that when we are making that investment we know exactly why we are making it and what we hope to accomplish.

And that objective alone is the beauty of the concept of adaptive management, you try things, you put them up, you try them, and you see what works. And you adjust as you go along. And that is one of the ways that we think this can be accomplished, rather than just looking at conclusary statements.

I think Mr. Ericson wanted to add something.

MR. ERICSON: Is that okay?

COMMISSIONER GEESMAN: Yes.

MR. ERICSON: I was just going to address some of the questions that you had on some of the earlier presentations relative to bat surveys.

The national wind coordinating committee is working on methods for nocturnal surveys. Bat Conservation International, which is the lead conservation group for bats, is also working on what type of method you could use to try to understand bat use prior to wind projects being developed.

The difficult thing is that most of the bats that are dying appear to be migratory. So, studying migratory bat use is very difficult.

The other thing, the mortality levels at high winds for bats is in line for what's been observed at other new generation wind projects in the west, okay, when you look just at observed fatality rates.

We don't have corrections for search or efficiency in scavenging at high winds for bats, but if you look at observed fatality rates and take into account the interval they used for searches, the 14 day interval, compared to other studies that have used 14 day intervals, the Stateline wind project in Oregon and Washington, similar bat fatality rates.

So it's fairly common occurrence at the other new generation wind projects. It's relatively low compared to the mortality rates in the east, where you're looking at forest and ridge top situations with 40 to 60 bats a turbine a year, versus one to two, in that range, one to three.

The work that's being done right now by the Bat Wind Energy Cooperative, I was their

principle investigator this past year, under contract to BCI to look at the post-construction survey methods for bats, as well as looking at the interaction between weather factors and turbines and bat kills.

That is ongoing, that's a collaboration between industry and Bat Conservation International and Fish and Wildlife Service and Department of Energy.

The range of mortality, I think Rick was pretty much on target. The low end of the range of mortality is from search efficiency adjusted estimates, so they take what you find and look at the percentage of bird you'd expect to find based on trials.

Now those trials were conducted by Orloff for raptors in the early 90's, and then the corrections they used for other birds was from our work at Stateline in Oregon and Washington, so around 40 or 50 percent of the small birds being picked up by searchers.

And it also include an effect for some birds land outside your plots, so it's trying to account for what birds might land outside your plots. You only search 50 meters out.

And then the high end is from scavenging studies, again. It's a scavenger adjusted estimate from scavenging study we did at Stateline wind project in Oregon and Washington as well, to provide a range.

There was no confidence intervals in the report, but it was, that was the range that was recorded.

On the NWCC, it's not a part of the American Wind Energy Association, it's a collaboration among environmental groups, industry, utilities, and it's funded by the Department of Energy.

And the wildlife working group, which I'm a member of, is a subcommittee to that that addresses issues. Dick Anderson is the chairperson of that right now, and it's addressing things like nocturnal methods, displacement, indirect impact issues, things like that.

European studies, most of the European studies have focused most recently on not direct impacts, not mortality, they focused more on other potential indirect impacts.

There was mortality studies done in the mid-90's. Winkleman was one that did quite a bit

of work. And they kind of went away from looking at mortality because of the levels they were seeing and focusing on other impacts.

And the, I guess I mentioned the bat mortality at Solano county. And the high raptor mortality there, it involves calling it relatively high. It's relatively high to the new generation wind projects that have been studies.

There's probably a dozen or more studies out there outside California at new generation wind projects and in general the mortality has been quite low for raptors. It's probably a function of siting location, bird use, as well as possibly technology. And hopefully we'll know quite a bit on that as repowered projects occur.

In Altamont right now we are working on the monitoring of the Diablo winds repowering project, which is constructed. It's the first one in the Altamont that is constructed. We just started monitoring in March, and after we gather information we'll have a better idea of where things are at relative to raptor mortality.

COMMISSIONER GEESMAN: What size machines does that project use?

MR. ERICSON: They're 660 KW, so they're

the largest turbine, other than one 750 turbine in the Altamont is a 400 KW KVS 30 meter rotor diameter. This is a V47, 47 meter rotor diameter, and it's off the ground, let's see what does the lower blade reach, it's 27 meters on most of them.

And so hopefully we see some of the results that have been hypothesized based on the flight paths for the target raptors.

On the leeward side mitigation, we had done work at Foot Creek Rim and noticed, and I think most raptor biologists will tell you that raptors tend to use the unwind side to use the updrafts, the thermal updrafts and so on to fly along the ridges.

And at Footcreek Rim in Wyoming that was a site that was on a flat tabletop mesa. Turbines are pulled back away from the rim edge. It was a unique situation, you could do that without losing power, and they were using bigger turbines in that case.

And although we didn't have mortality data at turbines that were next to the edge or on the windward side, the mortality levels for, at least golden eagles, was lower than what was anticipated, based on the use of the area.

I guess that's it. I appreciate you allowing me to provide some of that information.

COMMISSIONER GEESMAN: Are there areas, I don't want to get into an editorial criticism in terms of choice of words, but are there areas of the staff report that you regard as completely offbase? Scientifically unfounded?

MR. ERICSON: Not necessarily. I think the way the data was collected and the way it was analyzed is appropriate. You brought up the question of interactions, that's one of the general concerns we had was there are interactions out there of these factors.

One good example is tubular and lattice turbines. We saw that analysis, and the original report suggested that tubes were worse than lattice, and I think that's been pulled back a bit because of thinking about some of these confounding factors.

One of the confounding factors we identified was that only a very small percentage of the lattice towers that were studied were in canyons, so -- I think it was 19 out of multiple hundred of the turbines studies that were in canyons, considered canyons.

MS. FELLMAN: Are you talking about today's staff report or the 2004 staff report?

COMMISSIONER GEESMAN: Let me clarify, the 2004 staff report.

MR. ERICSON: Okay. I'm bringing up just one issue that I think you brought up with interactions. Tubular towers, in the tubular towers a fairly large percentage, I don't have the numbers in front of me but roughly 40 percent of the tubular towers were identified as canyons.

And so we had mentioned that to Shawn and to staff, Linda, and they did some analyses and I think that was one of the things that they, in recent reports, had pulled back away from this, you know, tubular necessarily being worse, but that, it's not conclusive and there's no obvious affect that lattice towers are worse.

So part of this issue of interactions I think, it's a complicated study, you have different turbines that came into the study later as they got access, and so this issue of sampling effort at different turbine types made it difficult to address some of these interactions, but I think it is an important issue that hopefully down the road we can get at some of

these interactions in a little more detail.

COMMISSIONER GEESMAN: I will say that, like Ms. Fellman, I suffer from a legal background, so we have a similar cookbook as it is for what makes an effective report, what makes a sound basis on which to base either regulatory decision or public agency developing policies.

But part of the glory of the Warren-Alquist Act and the way our Commission is structured is, Commissioner Boyd and I don't have any role in supervising the staff. We make one decision, occasionally, and that is to hire an Executive Director.

Our Executive Director is responsible for managing the staff and ultimately responsible for structuring their work. As I indicated, we will have a new Executive Director beginning on Monday, and I would encourage you to share your thoughts on this subject with him, Ms. Fellman.

And I will certainly convey to him, when I see him next week, the fact that your concerns have been registered.

Having said that, I don't know what considerations came into play from the staff standpoint in terms of timing or process or

anything else, so I don't mean to implicitly or explicitly criticize staff, but I certainly understand what you're concerned with, and I have to say my instinct is the same as yours, it doesn't sound right to me.

COMMISSIONER BOYD: I'll only comment that the process is awkward, but this is a workshop that we're having today, and the purpose of a workshop is to talk about everything that is on the table.

The dilemma I do see that you reference as fairly strong conclusionary statements but maybe the science isn't quite good, and the fact that it says it as a staff report, and as all these staff reports do, they go into the public arena and they get quoted as the Energy Commission's point of view on things, and in reality this is either a draft staff report or a staff's report to this committee to be considered in a workshop setting, and all the input from this document and from all the testimony will ultimately end up in the final Integrated Energy Policy Report, complete with its recommendations or what have you.

So we all wrestle with this dilemma, and

to not fault the staff, I don't know, what is this, hearing number 40 or -- I don't know, I've lost track.

COMMISSIONER GEESMAN: I heard our Chairman say that we've had 50.

COMMISSIONER BOYD: Well, all right.

COMMISSIONER GEESMAN: He must be keeping track of the budget.

COMMISSIONER BOYD: In any event, they are tasked to do an incredible amount of work in a short period of time, and I'm sure corners that maybe they wouldn't like to cut get cut in order to meet the deadlines established in order to have hearings.

So, it is a potpourri of activity that we work with, and it'll get better each year. Maybe by the time I retire we'll really be real good, but --.

MS. FELLMAN: May I respond, to that particular point?

COMMISSIONER GEESMAN: Yes.

MS. FELLMAN: I know Mr. Wiebe wants to speak. Commissioner Boyd, our concern, or the wind companies that I'm representing here's concern, is not that the CEC staff should stop its

research or that it's research is flawed in any way, our concern is that there needs to be a process on the one hand, and on the other hand that work that's being done for the IEPR, which is why we came in with this today, that work that comes out of this process, they're asking for you, the Committee, to make recommendations to the Commission, and of course there will be draft reports on the way, so this 30 page or 40 page report can be boiled down to two paragraphs in the final IEPR.

But that those two paragraphs will be important in terms of how our industry can do its business going forward, and does its business with respect to mitigation of wildlife impacts going forward from this report.

And also that a report of this nature is used for purposes beyond the IEPR. So it's not just funneling in to this process, but it goes to the counties and it goes to Fish and Wildlife, so it's a dilemma, and we heard, you know, I heard Linda Spiegel say today and I would more than, welcome her to call us and return our calls when we call, and just have Wally and Linda sit down and Shawn Smallwood sit down and really talk about

this thing and work things out and then have us come in to the CEC.

So if there's any way that this IEPR, in terms of looking at the mitigation on avian impacts, which is something you already have in the 2004 update, can have a process component. That's what we're requesting today.

COMMISSIONER GEESMAN: Yes?

MR. WIEBE: I think it's important to distinguish between questions of science and questions of policy. And one of the things that has really struck me as fairly remarkable about the avian impact issue, particularly at Altamont, has been the absence of serious dispute about the science.

I think the debate and the disputes has been about what policies do you adopt in light of the science, and as far as the scientific results go it was my understanding in fact that before the August 2004 report was published in fact, that there were informal presentations by the CEC staff, and by the investigators, of the data to Mr. Ericson and other representatives of the wind companies.

I was also told that they had received a

draft version of that report before it was published for comment, something which I asked for and didn't get.

So I think it's important to keep the scientific debate separate from the policy debate. And as far as the policy debate goes, I think there is a process, there's lots of process.

There's this workshop here today, there's all the proceedings that Darryl Gray and Alameda County have been conducting on this issue, and there's been healthy and vigorous debate in that process. And there's been opportunity for everyone's views to get expressed in that process.

So, I'd like to keep that distinction in mind as we look at this question and, again, I've been very impressed with everything that the staff at this Commission has done.

MR. MCKINNEY: Commissioner, if I may, I'd just like to clarify our process here. I did not make introductory comments to this part of the workshop the same as I did yesterday morning.

In my view we are in fact right in the middle of the process that Ms. Fellman is commenting on. And the way it works with the Environmental Performance Report and the

Integrated Energy Policy Report is that staff does develop a series of reports summarizing science, interpreting that science to the best of our ability, and then compiling those into a document with a series of staff policy options, as warranted by the situation.

We then hold a workshop like this, which is quite transparent and quite public, even though we didn't get our papers posted as early as we intended to, and that's where it sits. And then the action switches to you, the Commissioners, and it's at your discretion to pick from the issues and elements identified by staff, to pick from comments and other issues raised by industry and other stakeholders, and weave those into the final policy report, as you see it from your perspective.

Also as a point of process we will be compiling comments received from all stakeholders, and as appropriate we can prepare a response to comments, as we do in our CEQA process.

COMMISSIONER GEESMAN: Well, I am going to guess that Ms. Fellman, when she submits her written comments, is going to provide more detail in exactly what her procedural criticisms have

been, and you will have an opportunity to respond to those.

MR. MCKINNEY: And my phone number and e-mail address are widely available throughout the record, so please feel free to contact me at any point. I'm the Project Manager, so the buck stops here until it goes downstairs to the Commissioner row.

MS. FELLMAN: And we appreciate that, and we will provide not only procedural comments with detailed scientific comments as well, and I understand that that deadline is July 15th, Mr. McKinney?

MR. MCKINNEY: Yes it is.

MS. FELLMAN: Okay. We will meet that deadline. Right, Wally?

COMMISSIONER GEESMAN: Now, is it time for me to go to blue cards?

MR. MCKINNEY: I believe it is. And we do have one more module to today's workshop.

COMMISSIONER GEESMAN: Okay. Scott Flint, Department of Fish and Game.

MR. FLINT: Thank you for entertaining my comments this afternoon, Commission members. And I thank the rest of the audience for letting

me go first, although I think I've missed my other appointment at this point.

I'll make my comments brief. Many of the things that I had here have already been stated. I'll just give a little perspective of that of the Department.

First, dealing with the wind power facility issues. We get involved in various ways, including individual contacts to consult on facility proposals, requests for reviewing applicant studies to determine adequacy for impact analysis and effects, opinions from project proponents on whether or not permits will be required from the Department.

When certain facilities are known to impact state-listed species we do have a permitting role, we do have a few projects in the state that are wind power projects that are under permit, but not for impacts to listed birds, they're terrestrial species. So we do have some where we've been involved at that level.

Our primary role is responsible entrusting agency through the CEQA process, with the county being the lead from the regulatory side to date. We do expect, however, with the large

number of wind power facilities proposed for California, potentially 40 to 50 in various areas of the state, that we may play a larger role in incidental take permitting in some of the projects.

The Department recognizes and appreciates the significant environmental benefits of wind power as a renewable and clean energy source for California and its importance in the state's power portfolio.

From the Department's perspective we also do have some statutes and regulations on the books which, to take avian species by the wind power project, is in direct conflict with. And so we're interested in working through this issue to the best of our ability to meet the goals of promoting and sustaining wind power in California but protecting the environment to the extent we possibly can.

Many of those laws were already cited here, several of those laws were already cited here, and the birds of primary interest have already been cited, golden eagles, redtail hawks, kestrels, and burrowing owls.

The Department's preferred mode of

operation on all dealing with species impacts and trying to protect the environment is not to be in a regulatory role.

For instance, the burrowing owl was petitioned for listing a while back. That listing didn't happen. However, we would expect it to be reintroduced for listing, depending on the frequency of impacts.

So we know that species as being on the edge, probably reaching a critical population level. So we want to take proactive steps prior to listing to reduce impacts to that species and head off a potential for listing, accomplishing our goal, working cooperatively with projects.

COMMISSIONER GEESMAN: Besides the burrowing owl, how did you select the other species that you identified?

MR. FLINT: The species I identified have some special protection under the Fish and Game code. One being a protection that protects raptors, and most of those birds are raptors. And another statute for fully protected species which basically allows no take, and we have no mechanism to permit take those species.

COMMISSIONER GEESMAN: Do you think that

those species then ought to be the focus of our concern, or should we adopt the broader list of concerns that I believe our staff put forth?

MR. FLINT: I think, I didn't mean to give the impression that's our only area of concern, but those are critical and where we see regulatory or legal conflicts that the department needs to work to resolve.

No, certainly the other species, impacts are important. And also bats, a sensitive species. We also have a suite of species that are terrestrial that we haven't talked about, because the focus is on avian impacts, that we deal with in siting and constructing these plants and their related infrastructures.

So there are terrestrial species. I won't go into that list.

Now, given the earlier comments on the process, I think our agencies commonly face this dilemma of needing to make decisions with the best available information and debates about science.

I agree that debate needs to happen, however, I think ten years of study by the CEC staff and the PIER-funded research has produced a large body of information from which we can lead

off as a starting point to start realizing the extent, or the magnitude of the impact, and work to develop some meaningful way to reduce that.

So, given that, I think we support most of the recommendations in the staff report as a starting point for working through this issue.

Specifically, we need more information, pre-construction and post-construction. I won't speak to the length of time required or anything, at this point that's up to debate.

But any information we can gather pre- and post-construction is going to help us resolve the issue, particularly since we think that the site-enhanced ability to site these in environmentally friendly locations will reduce a lot of the impact.

Typically we use a process of not directly adapted management, that word had a different context, but a positive feedback if you will sort of implementation of mitigation measures.

When we don't have known measures that work we try measures and constantly adjust those measures based on monitoring feedback so that measures that aren't working are discarded and

better measures come into play.

So, I think these mitigation measures are a good starting point, at least for dealing with impacts on the existing facilities as we go forward.

The positive actions that have begun and we will continue to support and be involved in is I would like the CEC to remain in an active and a leadership role as we work through these issues. That's been important and vital. You've provided the leadership in dealing with a lot of the environmental issues on energy projects, and we would like that to continue.

The Department will continue to work with CEC siting and biological staff to come up with mitigation guidelines, work on better ways to evaluate mitigation effectiveness, assist in developing robust study designs and protocols and methodologies for the refined either pre-, post-, or additional studies that need to take place to highlight impacts or the extent of impacts.

We'll work cooperatively with the industry at the local jurisdictions to ensure and improve implementation of avoidance minimization and mitigation measures, as appropriate.

Identify relevant research needs to be evaluated and studied, such as bat mortality and avian population impacts. One of the questions that I think came up earlier, we have a lot of data on birds being killed, but how do we make tradeoffs with species, which we're going to have to do at some sites, and we need to get a handle on what those impacts really mean to the populations, either in the local area or overall.

And that is difficult to do, but we're going to have to do that in some fashion.

And then assist in developing appropriate habitat mitigation. This is a difficult area to mitigate. Most of the mitigations would be considered somewhat out of kind mitigations, so we're trying to protect land and enhance carrying capacity to replace lost birds, and that's a little different from taking a wetland and replacing a wetland in kind.

So it requires a little bit of thought and creativity in being able to achieve that. But we're committed to work on that.

And in the current arena there is some, the many jurisdictions and the many levels are creating some inconsistent application or

implementation of these different things, and there needs to be some sort of statewide level guidance, and we would encourage the development of that, to establish standardized and fair implementation of measures, be it monitoring, pre-project evaluations, post-project monitoring or mitigation and its effectiveness.

So we're willing to participate in that to the extent that we can, given that we are limited in staff, and our role to this point has been mostly advisory under CEQA, which is why our involvement has been somewhat spotty to date.

So, with that I thank you.

COMMISSIONER GEESMAN: Thank you very much, Mr. Flint. Patricia Pilz, Pilz and Company?

MS. PILZ: Good afternoon, Commissioners. My name is Patricia Pilz, and I'm a principle in Pilz and Co., it's a Sacramento based business that does very early, early stage wind facility development. We generally work with wind developers very early, in very early stages.

We have several concerns with respect to the staff report, and we're grateful for the opportunity to express those today. We're members of the California Wind Energy Association, who is

aware of the issues that we're going to raise today, and they may make comments on their own, but I'm just speaking for Pilz and Co. today.

We're concerned with the level of avian mortality in Altamont, and I'm about to do the thing no one else has done, and say but we're also concerned about the quality of the science.

We have two issues. One, that the studies that are referenced in support of the staff assessment have played fast and loose with the numbers, and that they produce exaggerated and inflammatory mortality estimates.

The second is that models and untested hypothesis have formed the basis of what is being presented as real-life mitigation opportunities.

One example I'd like to give you with respect to the numbers. In the most recent five years, or if you do a four years plus one, Altamont purchased a total of two ferruginous hawk carcasses were found, but the number crunching has produced an annual estimate of ferruginous hawk mortality, turbine related mortality in the Altamont, of 15 to 24 birds.

That disparity, that gap, exists across all the species. Now, we understand that the

multiplication is meant to correct researcher bias, carcass removal rates, unstudied areas and partial year periods.

But the result is an estimate of wind facility related mortality in which it is difficult to place a high level of statistical confidence.

One of the reasons for the largest gap is that there was a short year period included in the studies at the end. It's the case in the mortality estimates for the Altamont as a whole that 76 percent of the expected golden eagle mortality, and 100 percent of the ferruginous hawk mortality could be eliminated in the Altamont if you just threw out the last set of data.

COMMISSIONER GEESMAN: Which you said was a short period?

MS. PILZ: A short period, yes. It was land that the searchers didn't have access to from the very beginning.

COMMISSIONER GEESMAN: How short a short period?

MS. PILZ: It was hard for us to tell just reading the tables. It could have gone from two months through six months.

COMMISSIONER GEESMAN: And it was intended to be 12 months?

MS. PILZ: Well, the study reports indicate that they don't feel a high level of confidence in these studies until they've been done for maybe three years. So, in any event, short was short.

We're also concerned that no control studies were conducted. The Altamont is a high avian usage area. We assume that some of these birds die of old age, they die of predators, they die of poisoning, but there's no baseline mortality. They're all assumed to be blade strikes.

Now to get to the problem we have with the hypothesis --

COMMISSIONER GEESMAN: Well, let me ask you before you go on, --

MS. PILZ: Sure.

COMMISSIONER GEESMAN: -- are you aware of how a control study under those conditions would be structured or could be structured?

MS. PILZ: Certainly. The same way you do it when you're doing field tests for pesticide registration. You apply your pesticide that

you're testing for registration to a field, and you have a clean field somewhere down the road.

And you look for avian mortality on the treated field as well as the clean field. In the case of avian mortality -- the Altamont is a very large place. Not all ridge tops have turbines on them, there is like land within the land, within the same landowners, on which baseline mortality, dead bird counts, could be done.

The same way it's done in other industries. It's not often done, sometimes done, not often done in the wind community. But especially in a high avian usage area it seems, to us, that one would expect to see some baseline mortality.

COMMISSIONER GEESMAN: And yet, over the ten or 15 years that these studies have been done, have any of them utilized that question?

MS. PILZ: To our knowledge, no.

Can I go to the blade strikes now?

COMMISSIONER GEESMAN: Sure.

MS. PILZ: We're aware that none of the studies cited in the staff report contains a scientific finding that turbine-related mortality is the result of blade strike. We know that

birds, in large numbers, collide with communication towers, with smokestacks, with silos, with skyscrapers, and none of those things have moving parts.

So why is it assumed that wind turbine associated mortality is solely caused by blade strike? This is hugely important, because the notions that a seasonal shutdown is going to 100 percent eliminate turbine mortality at those turbines, and that's what the study shows and that's how the numbers are counted, ignores cell towers, which is a huge source of avian fatality, and silos, and smokestacks and skyscrapers.

It's an untested hypothesis, we're not certain this is going to work. But it's listed as a policy option, and that causes us grave concern.

So, we didn't have a lot of time to prepare for this either, but we did prepare a paper that sources all of the avian fatality data in the Altamont Pass resource studies that have been presented and form the basis for the conclusions today. That is prepared and it will be submitted during the comment period.

And we thank you very much for the opportunity to speak.

COMMISSIONER GEESMAN: You probably didn't know we were getting into such a long afternoon today. It sounds like it's going to go on for some time as we sift through the written comments.

Mr. McKinney, where do we go next?

MR. MCKINNEY: Commissioner, if there are no further comments from members of the audience or those participating by telephone, we do have one last module which deals with avian impacts and power lines.

So, it's not yet 5:00, so I suggest that we power through. I do note that we have meeting scheduled with you to begin debriefing on the two days of workshops, but perhaps we need to defer that to another time.

COMMISSIONER GEESMAN: That might be a good idea.

Thank you all for participating. I do think that this has been quite helpful. It is a large mass of information for us to sort through, but we will endeavor to do so, and I think that we will very carefully frame the language that we will put in to our committee report, which will come out in early September.

In the meantime, as I indicated to Ms. Fellman, B.B. Blevins is our new Executive Director and he'll be on board Monday. And I invite you to share your concerns with him.
(Off the record.)

PART TWO

MS. DORIN: So, part two is avian interactions with powerlines. I'd also like to thank PG&E, Southern California Edison, San Diego Gas and Electric and SMUD for providing the data for this portion.

The Energy Commission interest in avian electrocution and collision on power lines, interactions with power lines cause outages that result in the liability issues and high costs.

The transmission line system will continue to expand to meet electrical needs of California.

California is part of a Pacific flyway and is home to a large number of wintering birds that use the extensive network of refuges and flooded agricultural fields.

At the same time of year that wintering habitat is used, visibility is low due to tule fog and transmission lines are hard to see, and

obviously we want to protect the natural resources of the state while supplying electricity to its residents.

In the environmental performance report of 2003 a finding was made in the biology section to limit siting of new transmission lines in refuges. That would be transmission lines within Energy Commission jurisdiction.

So current knowledge. Although well documented, the extent of electrocutions and collisions have not been accurately quantified. So there are known occurrences, but getting at the number of how many there are is pretty difficult.

One of those reasons is there are no statewide surveys being conducted and as far as staff knows there haven't been any comprehensive statewide surveys done to date.

Fatal impacts have been documented for nearly 350 species nationwide, and in some cases collision levels have contributed to declines in local and regional populations. And that's cited from the Avian Powerline Interaction Committee documents.

So, once again, we have a range of collision estimates, from tens of thousands to

over 1.5 million annually. One of the reasons for that range is, again, it's difficult extrapolate out, and probably not appropriate to.

So current knowledge, electrocutions usually occur at distribution line power poles 69 kilovolts or less. While collisions are documented most frequently on transmission lines greater than 69 KV.

Although there is some indication that collisions may be occurring on distribution lines also.

More research has been done on documenting and resolving electrocutions than on collisions. And although annual fatality rates have not been quantified, utilities are taking steps to reduce electrocutions.

And for this white paper staff did contact some utilities to see if specific electrocution and collision data, number of birds, was available, but instead I learned about some of the programs that the utilities are doing in order to retrofit power poles and their avian protection plans.

COMMISSIONER GEESMAN: Does that mean that there are no such data?

MS. DORIN: There are data, but what I found out is that there not really available to the public. It's mostly in use, the utilities keep track in their databases of the electrocutions and collisions they have and the species, and in some instances they do report that to the Fish and Wildlife Service.

But they weren't going to share how many birds are killed.

COMMISSIONER GEESMAN: Okay. So if we want that data it will have to be in our CFM for it's next cycle.

MS. DORIN: Right. And that's actually one of the things we recommend to get a better statewide perspective.

COMMISSIONER GEESMAN: Good.

MS. DORIN: So collisions with powerlines occur when birds cross transmission lines in daily use areas. They move from roosting and foraging habitats if they're crossing the same lines to go from field to field, say.

They also occur when birds migrate through an area. that would be at night. Rain, fog, night, and other low visibility issues can contribute to collision risk.

Body size, maneuverability, height the birds fly also contribute to collision risk.

Electrocutions. Large birds and raptors are electrocuted through face to face and face to ground contacts. Linda will talk a little bit about what that means.

Small birds can be electrocuted from bushings and transformers and other pole hardware.

And much of the focus remains on reducing raptor electrocutions.

COMMISSIONER GEESMAN: Why?

MS. DORIN: That's just where the research has been headed, and that's where the Avian Powerline Interaction committee documents have headed. I don't know, they may tend to cause more outages or they're, that's just where the focus is for research so far.

One of the studies that I did talk to Arizona Electric, sorry it's Tucson Electric. And they conducted a study last year and what they did was they monitored all the power poles within 500 meters of harris hawk nests.

And before the retrofits they found they were having 1.3 electrocutions per nest. After the retrofits they only had .3 electrocutions per

nest.

All electrocutions after the retrofits occurred on poles that were only partially retrofitted or they were overlooked, not because of equipment failure. So there were some poles behind trees, that sort of thing, where they just kind of missed when they went down the line.

What they did find was that retrofits were successful at reducing electrocutions.

The other interesting thing that they found was that only about 15 percent of the interactions that the birds had with the lines resulted in an outage that notified the utility, on their relay system.

So they turned that around and found that 85 percent of the electrocutions may go undetected. And that was for that particular study.

So they did find with their survey methodology that the number of electrocutions and collisions could be accurately detected, and the number of bird impacted by electrocution or collision are underestimated.

Other research results. A study in Colorado showed that porch guards may shift

raptors to unsafe portions of the power pole, and there have been very few studies on bird flank diverters, but most of the ones that they found that were performed did reduce collision rates.

And the Crowder and Rhodes is a review of all of the collision studies that were done.

Regulatory setting. Pretty similar to what we discussed in the wind turbine portion.

Permitting authority for the distribution lines is with the local agency or utility district. Transmission lines are permitted by the CPUC.

And, once again, protection is by the following acts.

And unlike in the wind turbines, there are state and federally endangered species that do get killed on power lines.

Legal issues. Once again the utilities may be reluctant to share fatality data because of feared legal repercussions of killing protected species.

In two cases, US Fish and Wildlife Service prosecuted Noon Lake utility district in 1999, and they won. They were fined, and as part of the mitigation they had to go through and

retrofit power poles, and they are conducting followup studies.

US Fish and Wildlife Service settled the case with Pacific Gas and Electric in 2002, and part of that settlement was to develop an avian protection program.

COMMISSIONER GEESMAN: What was the nature of the case?

MS. DORIN: For the PG&E case?

COMMISSIONER GEESMAN: Yeah.

MS. DORIN: I didn't get that much information on that since it was settled. I believe it was under the Endangered Species Act.

COMMISSIONER GEESMAN: Do you have a sense as to how many instances of violation it takes to trigger Fish and Wildlife Service to initiate action against a utility?

MS. DORIN: It seems like, because it's a collaborative process, if there's a proactive approach by the utilities the Fish and Wildlife Service is there to help implement plans and go through which areas may be better for retrofitting first, priority, those sorts of things.

I think it may be when utilities aren't that proactive and the Fish and Wildlife Service

is asked. And I would imagine that the Fish and Wildlife Service takes some time to build their case, so it's also them documenting that that's occurring.

So things that could be done to resolve electrocution and collision. Survey powerlines and poles to find out more accurately what the number of bird deaths are. Establish guidelines for surveys and mitigation monitoring and also develop plans to retrofit existing lines and research mitigation measures to determine their effectiveness.

So the middle two, establish guidelines, they are being done, they have been done. And develop plans to retrofit, they are being done also.

So two of the guidance documents that are widely used by utilities, by industry, are developed by the Avian Powerline Interaction Committee. And members include the utilities and the Fish and Wildlife Service. It's primarily industry.

The guidelines, once again, are voluntary. And the two guidelines, the first one is 1994, and that discusses collision impacts.

The guidelines recommend site analysis and bird use surveys, bird flight diverters as appropriate to make lines more visible, and there is some question about whether they are effective in low light conditions when birds cannot see them, especially like instances like the central valley, where there's high fog.

And siting guidelines are also part of the document.

1996, there were raptor protections for electrocution on powerlines. This is part of a focus on raptors. Minimum spacing requirements. Covering and insulating ground wires, and cover conductors, and changing cross arms and installing perch guards.

COMMISSIONER GEESMAN: And what's a perch guard?

MS. DORIN: They're a V that gets put on the power pole, and it gets put between the two lines, so that raptors or birds can't perch there. And so when they take off they can't hit the lines.

If they're installed incorrectly, though, the raptors try and squeeze in between the perch guards and the powerlines, which one of the

studies found they needed to be installed correctly.

And that actually goes back to the point about research mitigation measures to determine effectiveness. So, the ongoing studies that they've been doing for electrocution are really helpful, because they can figure out if that mitigation's effective, how to redesign it, and then update the guidelines accordingly.

Introduction to avian protection programs. The APLIC and the Fish and Wildlife Service jointly released guidelines just a couple months ago. The US Fish and Wildlife Service is encouraging this voluntary effort.

Plans are focusing on resolving electrocutions, and there isn't as much being done to resolve collisions. And as part of this paper I contacted several of the IOU's and the Sacramento Utility District and received, I actually contacted them for information on the bird kill rates and received information on what they're doing to resolve them.

And to get a statewide picture of electrocution and collision impacts, avian protection plan surveys could be sent to all the

utilities requesting all the information.

So, Southern California Edison's avian protection program. They retrofit any distribution pole where an electrocution is reported, and all new or rebuilt poles in their raptor concentration areas are built raptor safe. They also retrofit when maintenance is being done.

They do not keep track of how many power poles they retrofit every year, but they do notify the Fish and Wildlife Service of eagles and endangered species.

COMMISSIONER GEESMAN: That are electrocuted?

MS. DORIN: Correct.

COMMISSIONER GEESMAN: Okay.

MS. DORIN: Dan Pearson (sp) said they've had a brown pelican once in awhile, they'll get golden eagles, that sort of thing.

Non-raptors are the most commonly electrocuted, according to Southern California Edison. But of the raptors it's redtailed hawks and great horned owls.

PG&E also has an avian protection program. They call it the utility operations standard as part of their settlement agreement.

They report all their bird interactions to the Fish and Wildlife Service. And that's under the Migratory Bird Act requirements that they've set up.

All new and rebuilt poles in raptor concentration areas are also built raptor safe, and they also retrofit all poles and adjacent poles where an electrocution is recorded. So they go one step further, where they're required to retrofit adjacent poles to an actual electrocution. So that they're trying to, if there's an electrocution in one area they assume that there may be one close by.

And the information that I received from PG&E was 1,005 bird caused outages in 2004. 18 percent of those are from collision. And PG&E actually did report some of their bird fatalities to me since they had already released that information to the Fish and Wildlife Service.

San Diego Gas and Electric, they also have an avian protection program. They have 28 areas identified and once again they build new poles in these areas that are raptor safe. They use an electronic internal reporting system to track wildlife interactions, and they provide

training.

In the Sacramento Municipal Utility District they do not implement an avian protection plan if electrocutions occur at a power pole then that pole is retrofitted. Normally it has to be more than one electrocution, according to SMUD.

Since no plan is in place new poles are not built raptor safe. They do underground lines, like most of the utilities, in urban areas. But in rural areas they are not undergrounding lines.

COMMISSIONER GEESMAN: How do utilities discover an electrocution?

MS. DORIN: It usually, it'll relay back to the utility and notify that there's been a problem with the line. So it may not be a power outage, but it's an outage on the line.

And that's one of the things that I found that, in most cases there's no surveys. So it's only if a maintenance person finds a bird or if there is a outage triggered, a relay outage, that they would to look for the cause of that and find a bird.

COMMISSIONER GEESMAN: But under something like PG&E's settlement with Fish and Wildlife, all of those instances will be recorded?

MS. DORIN: Correct. So PG&E isn't doing, they're actually collaborating with PIER on some surveys, but for the most part they're not surveying their entire area either, but they do keep very good track of what the species is if it can be identified, where it was electrocuted, what poles they retrofit as a result of that electrocution.

And they report all of that quarterly to the Fish and Wildlife Service.

COMMISSIONER GEESMAN: And then you'd have to interpolate in order to get collision data for PG&E, using them as an example?

MS. DORIN: Right, right. So, if they find a bird under a line then they assume collision, versus electrocution at a pole. So they do, some of their categories would be perching or -- they have overlapping categories, so they would attribute a portion of that to collision versus electrocution.

Some utilities are developing plans to help address electrocution, but there's no standardized studies to determine how many birds are killed annually.

Utilities rely on outage information as

the basis for quantifying avian interactions, and that's one of the things, going back to, is, even if PG&E had a thousand electrocutions and that was only 15 percent, can you really extrapolate out that 85? Even interaction information collected by utilities is not made public, unless required I guess.

COMMISSIONER GEESMAN: Well, we could require it of them, and then it would go through our confidentiality process where they could request confidential treatment if they met our requirements. It might still not be public.

MS. DORIN: Right, right. Problems with retrofitting. So when I contacted the utilities I realized how many poles there are in the state, and how many miles of distribution and transmission line.

So even if PG&E is retrofitting 2,000 poles a year, if they have five million poles, that's a long haul. And according to the utilities, some of the retrofit hardware doesn't last very long, so they're having to do more maintenance on those poles.

And there's been some technological advances. Some of the new equipment, PG&E told

me, is expected to last ten years. But they're concerned about maintenance.

Costs to the economy. Collisions and electrocutions not only cause impacts to birds but also result in wildfires, power outages, and reliability of service. And there was a PIER report that estimated wildlife-caused outages cost the state between \$32 and \$317 million, and that was in lost productivity, that wasn't the value of lost wildlife.

And then Linda's next.

MS. SPIEGEL: In the interest of time I will skip some of this and move right in to, you've got a lot of background from Melinda.

So I'm just going to talk to you a little bit about what PIER is doing. These are the areas we're trying to address in our PIER research in collision and electrocution. We're trying to get a better handle on what's going on and what's causing the risk and how to get that information out.

This is a perch guard. And, as she was saying, there are some retrofits that have occurred that have actually exacerbated the problem, where we're getting more electrocutions.

A PG&E study that we funded awhile back showed that it oftentimes either was installed incorrectly or they're degrading in the field. For example, this perch guard needs to be over here, where the two energized phases are close together, not here.

So some of the work that we're actually sponsoring. At least with electrocution you can kind of get your arms around it, not like wind or collisions. You know what's the problem, you've got energized pieces of equipment.

But that Moon Lake study, the settlement, they had to retrofit a lot of their poles, thousands of their poles, so we're contributing a little bit to the studies of effectiveness on that, because there's a wide array of distribution pole configuration and hardware.

So a lot of them are represented in the study, and so what we're trying to do is look at what works and what doesn't work, so we don't repeat what doesn't work.

We're working with PG&E and Edison, developing some risk prediction models, as Linda mentioned we've got lots and lots of poles out

there and we can't retrofit them all.

We need to figure out what are the conditions that make these poles the most risky, and then funnel your retrofitting dollars to those areas. And that report will be coming out shortly, I think around the fall or maybe summer, maybe, still.

But, again, we're looking at different configurations and locations where it seems to present the greatest risk for the birds, similar to our wind work.

And then the effectiveness of flight diverters. We have one study where we have a graduate student from Sacramento, but this is also, I should have put on here that PG&E is also putting up funding for this, they bought the diverters and they put them on the line for us.

This is in the Cosumnes River preserve, it has a problem with water fowl and sandhill crane and threatened species hitting the lines, these are the distribution lines. Cosumnes River preserve, nature conservancy, they're all sort of pitching in in their own way on this.

We're looking at the durability of some of these diverters. In this case we were looking

at the effect of corona that could cause some interference on the line, sort of a radio noise or what have you.

But also degrade these diverters. These are flaps that you put on the line. Obviously you're trying to make the line more visible to a bird.

And what we found is that they all had some level of corona, even at low, I think 115, but then some got worse, at 230, but not too bad, a couple of them degraded but most of them didn't get damaged.

And we found that these really didn't show any level of corona until you get up to the really, really high voltage of 300 and something.

And this is a bird strike indicator that we've been working with WAPA and EPRI on, and some utilities have also provided some funding.

This is, you put this out on a conductor that's out in the middle of nowhere, because it's very time and cost intensive to go out and look and find out what's going on with these collisions, where do you have the biggest problems so you can, again, funnel your mitigation.

So these are, they're in prototype,

they're starting to test them in the field soon, hopefully. But these will record a strike, send it out to your monitor in your office, and these will tell you how many you're getting, so you can get a better idea of what line is the worst in your string of lines that you need to go out and try to do something about and mitigate.

Suggested practices. Again, these are suggested, they're not enforced. But we are using the information we're getting on these other studies and we're working with APLIC to update this one.

We don't have enough new information on the collision document as of yet, so we're not doing anything with that.

And this is cool, this is a website we're developing that will help linemen and utilities understand how to best retrofit a problem pole. This website will be released pretty soon, as soon as our web people say it's okay to go.

But for example, you can find the pole -
- say you get a lot of electrocutions on a certain pole and you're not sure just what to do. You find your design, these are just some we have in

there obviously but, you find your design and then you match it up and click on that.

And then you get a better picture and it tells you what your problem is is probably this spacing here. So you can either one, get a perch guard, or two, insulae this. This is telling you a perch guard, this is telling you to insulate.

You click on this and it'll take you to different products that have been used to do this and your availability and even where you can get them, for that matter.

And then there's also like a testimonial, "this product worked in the past for us," "this degraded," "this seemed to work better than others." And this will be a confidential type of site, in other words, you can supply the information to this -- not confidentially, but you can supply the information to this anonymously.

So we think this is going to be a great tool for them to be able, for the utilities to be able to go out and figure out what they can do immediately in the field, particularly now there's all this wireless.

And this is our raptor field guide, we like to call this the field guide for the Addams

Family. It's just, it's a guide to dead birds, basically skeletons. And while it might seem morbid, this was a very best seller for us.

We went through 3,000 copies and EDM's had another few thousands, in a matter of months. So we still get requests for them. But they're on our website.

So that's what we've done in electrocution. I think we've been having a very successful program making a lot of good progress, getting a lot of good information out there and tools.

Collision, on the other hand, we haven't, don't have a very good handle on it yet. It is difficult to study, maybe this bird strike indicator will help us do that. We have a lot of fog, as shown on this lower picture, in the Central Valley.

So bird deflectors, diverters, may not work very well. If you can't see your hand you're not going to see the diverter. But we did look at, PG&E conducted a study at Mare Island several years ago, and they found, this is probably the most comprehensive study we have in the state.

And they found 313 birds per mile per

year. That was in an area obviously of high waterfall use. We have the Central Valley, we have bird refuges, and we've got a lot of transmission systems running through there.

So we had the potential for a lot but we haven't really gotten our arms around this one yet, and we hope to start kind of leaving electrocution behind, I think we've done a lot of work there, and maybe start working on this issue. And that's it.

COMMISSIONER GEESMAN: Does that Mare Island data break down by species?

MS. SPIEGEL: You know, I haven't looked at it in a long time, but it may.

COMMISSIONER GEESMAN: Any questions or comments from our survivors in the audience?

MS. DORIN: I have two more slides actually. Just the findings that we --.

So, once again, some utilities, researchers and resource agencies have documented avian collisions and electrocutions for years. There is a lack of standardization for collecting and reporting the data and the Arizona study suggests that up to 85 percent may go undetected.

Some utilities are making progress in

developing protection programs. Raptor safe powerlines are constructed voluntarily. The APLIC guidelines are well used by many stakeholder, including industry. Updating the guidelines regularly allows for new information to be incorporated.

Statewide construction standards would ensure the greatest reduction in electrocutions and collisions, that would be spacing requirements, that sort of thing. Additional long-term studies would help assess the scope of the impact and how implementation can reduce the impact.

I think PIER's probably doing a pretty good job of assessing that. And collaborating with industry researchers and other stakeholders is an effective way to share information and continue to resolve the impacts.

So, policy options, things to look at. Could be statewide guidelines for electrical power poles. At least they'd gain consistency statewide with construction standards.

Support the effort to update electrical transmission line guidance documents, and support long-term monitoring studies through PIER and

environmental area efforts. That's it.

COMMISSIONER BOYD: One question. How do I incent my utility, SMUD, to get with the program?

MS. DORIN: I think the more information they have probably the better they would do. I don't know that they know, that they think of it as an important issue since they have not as many lines as some of the other utilities.

But they don't seem to -- when I contacted them it was, they were very surprised that --

COMMISSIONER GEESMAN: Anybody was watching?

MS. DORIN: Yeah, maybe that was it.

COMMISSIONER BOYD: Well, I know one general manager and three board members, so I'll try to remember.

COMMISSIONER GEESMAN: I think that, you know, we may be able to accomplish a fair amount here simply by using our information gathering authority.

Because I suspect that, and take SMUD as an example, aren't they a participant in the TANC line, the Transmission Agency of Northern

California, that runs all the way to the Oregon border?

MS. DORIN: I believe they are.

COMMISSIONER GEESMAN: I think that, if we start gathering this data it may incent a lot of activity among a lot of different utilities.

MS. DORIN: Well, and I think that's true for the electrocution and for the wind turbines. Because you have differing operators and SMUD, since they're a utility, they don't go through Solano County or Altamont, so just having everybody on the same page with the same discussion is important.

COMMISSIONER BOYD: But this is a huge bird area, the Sacramento area. Refuges, waterfowl in the winter because of the rice field, etc., etc. I don't know if we have a big problem, but -- and SMUD's usually pretty oriented this way.

So it could be they don't have much problem with it, they just haven't looked.

MS. DORIN: And I think, is the study that you're doing, are they looking at just PG&E poles, or it is SMUD poles too?

MS. SPIEGEL: PG&E.

MS. DORIN: PG&E. Okay. Thank you.

COMMISSIONER GEESMAN: Thank you all very much. This has been an exhaustive but highly informative day.

(Thereupon, the workshop ended at 5:10 p.m.)

CERTIFICATE OF REPORTER

I, CHRISTOPHER LOVERRO, an Electronic Reporter, do hereby certify that I am a disinterested person herein; that I recorded the foregoing California Energy Commission Workshop; that it was thereafter transcribed into typewriting.

I further certify that I am not of counsel or attorney for any of the parties to said hearing, nor in any way interested in outcome of said hearing.

IN WITNESS WHEREOF, I have hereunto set my hand this 11th day of July, 2005.